



Environmental Management Dept
PO Box 231
Wilmington, DE 19899-0231
302-429-3542

February 6, 2020

SENT VIA CERTIFIED MAIL 7011 1150 0001 6024 8089

Ms. Katayoun Pirestani
Division of Air Quality
State Street Commons, Suite 6A
100 West Water St
Dover, DE 19904

Dear Ms. Pirestani,

Exelon Corporation is pleased to submit this construction permit application for the installation of an emergency generator at the Energy Technology Center (ETC). This application includes a description of the project, regulatory review, and permitting forms as required by Regulation No. 1102. Also included are two checks, one in the amount of \$325.00 for the Advertising Fee, and another in the amount of \$215.00 for the Application Fee. If you have any questions or require any additional information, please don't hesitate to contact me at (302) 429-3542 or Charles.May@pepcoholdings.com.

Sincerely,

A handwritten signature in blue ink, appearing to read "Charles May", written in a cursive style.

Charles May
Sr. Environmental Programs Manager
Delmarva Power

CC: Donald Phillips, Exelon

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1 INTRODUCTION

Exelon Corporation is one of the largest energy delivery companies in the United States, serving customers in Delaware, the District of Columbia, Maryland, New Jersey, Pennsylvania, and Illinois. Exelon Utilities subsidiaries, including PECO, ComEd, BGE, Pepco, Delmarva Power and Atlantic City Electric provide regulated electricity service; Delmarva Power, PECO and ComEd also provides natural gas service.

The Energy and Technology Center (ETC) located in Newark, DE houses the corporate IT department for Pepco, Delmarva Power and Atlantic City Electric, including company servers. The building also houses corporate support staff and executives. Exelon has determined that it is necessary to install a generator at the ETC to provide electricity for critical equipment located within the building in the event of an emergency. This document represents the Regulation 1102 permit application for this emergency generator.

2 PROJECT OVERVIEW

The proposed project is the installation of an emergency generator at the ETC to provide electricity to critical equipment within the building in the case of a power outage or when there is a deviation of voltage or frequency from the electrical provider of 3% or greater above, or 5% or greater below, standard voltage or frequency. The generator is a diesel-fired Cummins QSK23-G7 NR2 rated at 1220 bhp at 1800 rpm meeting EPA Tier II emissions. Manufacturer's specifications are included in Appendix B. PHI is requesting an operation limitation of 500 hours per year for this engine. A summary of the potential emissions for the emergency generator are shown in Table 2-1. Calculations of potential emissions are included in Appendix C.

Table 2-1
Summary of Potential Annual Emissions
Proposed Emergency Generator

Pollutant	Diesel Firing, 500 hours/year (tons)
NO _x	3.95
CO	0.19
PM ₁₀	0.03
PM _{2.5}	0.03
SO ₂	0.07
VOC (as HC)	0.08
CO ₂	354

3 REGULATORY REVIEW

The following section contains an assessment of Federal and State of Delaware air regulations that are potentially applicable to the proposed new emergency generator at the ETC. Federal regulations are discussed in Section 3.1 and the State of Delaware requirements are addressed in Section 3.2.

3.1 FEDERAL REGULATIONS

For the purpose of this application, the following federal regulations have been reviewed for potential applicability to the emergency generator installation at the ETC:

- Standards of Performance for New Stationary Sources (NSPS).
- Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Regulations.
- National Emission Standards for Hazardous Air Pollutants (NESHAP).
- Compliance Assurance Monitoring (CAM).

A review of each specific federal requirement is provided in the following subsections.

3.1.1 New Source Performance Standards (NSPS)

The US EPA has promulgated standards of performance for specific sources of air pollution at 40 CFR Part 60, Subparts A through OOOO. The following Subparts are determined to be applicable to the proposed project:

- Subpart A - General Provisions,
- Subpart IIII - Standards of Performance for Compression Ignition Engines

3.1.1.1 Subpart A - General Provisions

Certain provisions of 40 CFR Part 60 Subpart A apply to the owner or operator of any stationary source subject to a NSPS. Since the new emergency engine (Subpart IIII) will be subject to a NSPS, Pepco Holdings at the ETC will be required to comply with all applicable provisions of Subpart A. Applicable Subpart A provisions are identified in Table 3-1.

Table 3-1
Summary of Regulatory Requirements
of NSPS Subpart A – General Provisions

40 CFR Subpart A Section	Requirement	Compliance Action
60.7	Initial notification and record keeping	Submit all NSPS related notifications to DNREC and EPA Region III for the proposed project in a timely manner.
60.8	Performance Tests	Conduct all required performance tests using designated reference test methods.
60.11	Compliance with standards & maintenance requirements	Operate and maintain the unit using good air pollution control practices.
60.13	Monitoring requirements	Required pollutant monitoring pursuant to NSPS will utilize methods outlined in 60.13.
60.19	General notification & reporting requirements	All NSPS reports and notification will follow the format and schedule set forth in 60.19

3.1.1.2 Subpart IIII - Standards Of Performance For Compression Ignition Engines

Subpart IIII regulations apply to stationary compression ignition internal combustion engines (CI ICE) that are not fire pump engines and for which construction, modification, or reconstruction commenced after July 11, 2005 and manufacturing commenced after July 1, 2006. The new emergency generator is subject to this NSPS Subpart IIII.

3.1.2 Prevention Of Significant Deterioration (PSD) and Non Attainment New Source Review

PSD permitting requirements apply to projects considered a “major modification” or “major” stationary source located in an area designated as “in attainment” or “unclassifiable” for any criteria pollutant. Non attainment New Source Review requirements apply to major stationary sources or major modifications in non attainment areas. The ETC is located in New Castle County, Delaware, which is designated as “in attainment” or “unclassifiable” for all regulated air pollutants except ozone and PM_{2.5}. A “major” stationary source is defined at 40 CFR § 52.21(b)(1)(i) as any source with the potential to emit greater than 250 tons per year of any

regulated air pollutant or any stationary source defined as one of the 28 source categories listed in 40 CFR § 52.21(b)(1)(i)(a) with the potential to emit greater than 100 tons per year of any regulated air pollutant. The emergency generator is a synthetic minor source with a requested limit of 500 hours of operation a year. Therefore, the ETC is not a major stationary source, and the emergency generator is not subject to PSD or nonattainment NSR permitting requirements.

3.1.3 National Emission Standards For Hazardous Air Pollutants (NESHAP)

NESHAP promulgated prior to the Clean Air Act Amendments (CAAA) of 1990, found in 40 CFR Part 61, apply to **specific compounds emitted from specific processes**. Pursuant to the CAAA of 1990, NESHAP apply to **specific processes** identified as emitters of listed hazardous air pollutants (HAPs) are promulgated at 40 CFR Part 63. These “process-specific” NESHAP require affected sources to meet emission levels consistent with the Maximum Achievable Control Technology (MACT) and are typically referred to as “MACT standards”. Specifically listed area sources or stationary sources with the potential to emit greater than 10 tpy of a single listed HAP or over 25 tpy of a combination of HAPs are potentially subject to the MACT standards.

US EPA promulgated national emission standards for hazardous air pollutants (NESHAP) for existing reciprocating internal combustion engines, known as the RICE MACT (40 CFR Part 63, Subpart ZZZZZ), on March 9, 2011, with amendments promulgated January 30, 2013. The RICE MACT requires all RICE located at a major or area HAP source to meet HAP emissions standards reflecting the application of MACT.

The emergency generator to be installed at the ETC is in a designated area source of HAP emissions. Therefore, the emergency generator to be installed at the ETC would be subject to the RICE MACT. However, the emergency generator is a new source, and is subject to NSPS subpart IIII in lieu of the RICE MACT.

3.1.4 Compliance Assurance Monitoring (CAM)

Pursuant to requirements concerning enhanced monitoring and compliance certification under the Clean Air Act Amendments of 1990, the EPA has promulgated regulations codified at 40 CFR Part 64 to implement compliance assurance monitoring (CAM) for major stationary sources

of air pollution. The CAM regulations require owners or operators of such sources to conduct monitoring that satisfies particular criteria to provide a reasonable assurance of compliance with applicable standards. The requirements of this part apply to all pollutant-specified emissions units at a major stationary source if the emissions unit satisfies the following criteria:

- The unit is subject to an emission limitation or standard for the applicable regulated air pollutant.
- The unit uses a control device (as defined in 40 CFR § 64.1) to achieve compliance with the emission limitation or standard.
- The unit has the potential to emit (before the use of controls) emissions of the applicable air pollutant that are greater than 100 percent of the amount required for a source to be classified as a major source.

The emergency generator is a synthetic minor source, with the potential to emit emissions of less than five (5) tons per year. Therefore, the emergency generator is not subject to CAM requirements.

3.2 STATE OF DELAWARE REGULATIONS

The air quality regulations codified in the State of Delaware Code (Delaware Code) potentially applicable to this project are as follows:

- Regulation No. 1102 – Permits
- Regulation No. 1103 – Ambient Air Quality Standards
- Regulation No. 1104 – Particulate Emissions from Fuel Burning Equipment
- Regulation No. 1108 – Sulfur Dioxide Emissions from Fuel Burning Equipment
- Regulation No. 1114 – Visible Emissions
- Regulation No. 1119 – Control of Odorous Air Contaminants
- Regulation No. 1120 – New Source Performance Standards
- Regulation No. 1122 – Restriction on Quality of Fuel in Fuel Burning Equipment
- Regulation No. 1124 – Control of Volatile Organic Compound Emissions
- Regulation No. 1125 – Requirements for Preconstruction Review
- Regulation No. 1127 – Stack Heights
- Regulation No. 1144 – Control of Stationary Generator Emissions

3.2.1 Control of Nitrogen Oxides Emissions

Regulation No. 1112 sets standards for the emissions of NO_x from major NO_x emitting sources. As defined in section 2.0 of this regulation, a major NO_x emitting source “means a stationary source which emits or has the potential to emit nitrogen oxides at a rate equal to or greater than 25 tons per year in New Castle and Kent Counties and equal to or greater than 100 tons per year in Sussex County.” The emergency generator has the potential to emit 3.95 tons per year of NO_x while firing diesel oil with an hours of operations maximum of 500 hours per year. As these potential NO_x emissions are less than 25 tons per year, the emergency generator is not subject to Regulation No. 1112.

3.2.2 New Source Performance Standards (NSPS)

Regulation No. 1120 adopts in its entirety the National Standards of Performance for New Stationary Sources (NSPS) promulgated by the USEPA in 40 CFR 60 which regulate the construction or modification of stationary sources. The emergency generator at the ETC is subject to NSPS Subpart IIII. This applicability was discussed in the Federal Regulations Section.

3.2.3 Requirements for Preconstruction Review

Regulation No. 1125, Section 4.0 describes the applicability and regulations for sources subject to Minor New Source Review (MNSR). MNSR is applicable to sources that have the potential to emit equal to or more than 5 tons per year of NO_x, SO_x, PM_{2.5}, VOC, or an aggregate of HAPs. PHI is taking a limit on burning diesel fuel oil to 500 hours a year for the emergency generator at the ETC. As seen in Table 2-1, the greatest potential to emit of any pollutant subject to MNSR regulations is 3.95 tons of NO_x a year while burning diesel. Therefore, the emergency generator is not subject to further requirements of MNSR.

APPENDIX A – DNREC PERMIT APPLICATION FORMS



DNREC – Division of Air Quality
Application to Construct, Operate, or Modify
Stationary Sources

Form AQM-1
Page 1 of 4

Administrative Information

One original and one copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 West Water Street, Suite 6A
Dover, DE 19904

All Checks Should Be Made Payable To:
State of Delaware

<u>Company and Site Information</u>	
1.	Company Name: Exelon Corporation
2.	Company Mailing Address: PO Box 231 City: Wilmington State: DE Zip Code: 19899-0231
3.	Site Name: Energy and Technology Center
4.	Site Mailing Address: 500 N. Wakefield Dr <i>(if different from above)</i> City: Newark State: DE Zip Code: 19702
5.	Physical Location of Site: Same as Above <i>(if different from above)</i> City: State: Zip Code:
6.	Site Billing Address: PO Box 231 <i>(if different from above)</i> City: Wilmington State: DE Zip Code: 19899-0231
7.	Air Quality Management Facility ID Number: 1000300908
8.	Site NAICS Code: 221122 - Electric Power Distribution <i>(list all that apply)</i>
9.	Site SIC Code: 49110 - Electric Services <i>(list all that apply)</i>
10.	Site Location Coordinates: Latitude: 39 ° 39' 47" Longitude: 75 ° 40' 27"
11.	Is the Facility New or Existing? <input type="checkbox"/> NEW <input checked="" type="checkbox"/> EXISTING
<i>If the Facility is an Existing Facility, Complete the Rest of Question 11. If Not, Proceed to Question 12.</i>	
11.1.	Does the Facility Have Active Air Permits? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
12.	Is this Application For New Equipment or a Modification to Existing Equipment? <input checked="" type="checkbox"/> New Equipment <input type="checkbox"/> Modification of Existing Equipment <input type="checkbox"/> Other (Specify):
<i>If the application is for the modification of existing equipment, complete the rest of Question 12. If not, proceed to Question 13.</i>	



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Company and Site Information

12.1. Does the Equipment Have an Active Air Permit? ☐ YES ☒ NO

If the equipment has an active air permit, complete the rest of Question 12. If not, proceed to Question 13.

12.2. Permit Number of Existing Equipment:

13. Status of Equipment Being Applied For: ☐ Natural Minor Source
☒ Synthetic Minor Source
☐ Major Source
☐ Federally Enforceable Restrictions

14. Facility Status: ☐ Natural Minor Facility ☒ Synthetic Minor Facility ☐ Major Facility

If the facility is a Major Source, complete the rest of Question 14. If not, proceed to Question 15.

14.1. Responsible Official Name:

14.2. Responsible Official Title:

Contact Information

15. Name of Owner or Facility Manager: **Don Phillips**

16. Title of Owner or Facility Manager: **Supervisor, Facilities Operations**

17. Permit Contact Name: **Charles May**

18. Permit Contact Title: **Sr. Environmental Programs Manager**

19. Permit Contact Telephone Number: **302-429-3542**

20. Permit Contact Fax Number: **302-429-3272**

21. Permit Contact E-Mail Address: **charles.may@pepcoholdings.com**

22. Billing Contact Name: **Charles May**

23. Billing Contact Title: **Sr. Environmental Programs Manager**

24. Billing Contact Telephone Number: **302-429-3542**

25. Billing Contact Fax Number: **302-429-3272**

26. Billing Contact E-Mail Address: **charles.may@pepcoholdings.com**

Proposed Construction and Operating Schedule

27. When Will the Proposed Construction/Installation/Modification Occur: **12/19/2019**

28. Proposed Operating Schedule: **24** hours/day **7** days/week **52** weeks/year

28.1. Is There Any Additional Information Regarding the Operating Schedule? ☒ YES ☐ NO

If YES, complete the rest of Question 28. If NO, proceed to Question 29.



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Form AQM-1
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Proposed Construction and Operating Schedule

28.2. Describe the Additional Information: **Equipment is an Emergency Generator. Will be test run approximately 1 hour per month. Annual Maintenance run time will be approximately 10 hours per year. Any additional run time will be dependent upon duration of loss of primary electrical service to the facility. Total run hours not to exceed 500 hours per year.**

Coastal Zone Information

29. Is the Facility Located in the Coastal Zone? ☐ YES ☒ NO

If the facility is located in the Coastal Zone complete the rest of Question 29. If not, proceed to Question 30.

29.1. Is a Coastal Zone Permit Required for Construction or Operation of the Source Being Applied for? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Determination if it has not been previously submitted

If a Coastal Zone Permit is required complete the rest of Question 29. If not, proceed to Question 30.

29.2. Has a Coastal Zone Permit Been Issued? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Permit if it has not been previously submitted

Local Zoning Information

30. Parcel Zoning: **OR-UDC-Office Regional**

Attach Proof of Local Zoning if it has not been previously submitted

Application Information

31. Is the Appropriate Application Fee Attached? ☒ YES ☐ NO

32. Is the Advertising Fee Attached? ☒ YES ☐ NO

For help determining your application and advertising fees see:

<http://www.dnrec.state.de.us/DNREC2000/Library/Fees/DE%20Permit%20Fees.htm>

Attach the appropriate fees. Note that your Application will not be considered complete if the appropriate fees are not included.

33. Is a Cover Letter Describing the Process Attached? ☒ YES ☐ NO

Attach a brief cover letter describing your Application.

If the Facility is a New Facility complete Question 34. If not, proceed to Question 35.

34. Is a Copy of the Applicant Background Information Questionnaire on Record at the Department? ☒ YES ☐ NO

If NO, complete the rest of Question 34. If YES, process to Question 35.

34.1 Is a Copy of the Applicant Background Information Questionnaire Attached? ☐ YES ☐ NO

For a copy of the Applicant Background Information Questionnaire see

<http://www.dnrec.delaware.gov/services/Documents/Chapter79Form.pdf>

Attach a copy of the Applicant Background Information Questionnaire if applicable.

35. Check Which Application Forms are Attached:



DNREC – Division of Air Quality
Application to Construct, Operate, or Modify
Stationary Sources

Form AQM-1
Page 4 of 4

Application Information

- | | | | | | | |
|---|----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|---|--------------------------------|
| <input checked="" type="checkbox"/> AQM-1 | <input type="checkbox"/> AQM-3.4 | <input type="checkbox"/> AQM-3.9 | <input type="checkbox"/> AQM-3.14 | <input type="checkbox"/> AQM-4.4 | <input type="checkbox"/> AQM-4.9 | <input type="checkbox"/> AQM-6 |
| <input checked="" type="checkbox"/> AQM-2 | <input type="checkbox"/> AQM-3.5 | <input type="checkbox"/> AQM-3.10 | <input type="checkbox"/> AQM-3.15 | <input type="checkbox"/> AQM-4.5 | <input type="checkbox"/> AQM-4.10 | |
| <input type="checkbox"/> AQM-3.1 | <input type="checkbox"/> AQM-3.6 | <input type="checkbox"/> AQM-3.11 | <input type="checkbox"/> AQM-4.1 | <input type="checkbox"/> AQM-4.6 | <input type="checkbox"/> AQM-4.11 | |
| <input type="checkbox"/> AQM-3.2 | <input type="checkbox"/> AQM-3.7 | <input type="checkbox"/> AQM-3.12 | <input type="checkbox"/> AQM-4.2 | <input type="checkbox"/> AQM-4.7 | <input type="checkbox"/> AQM-4.12 | |
| <input checked="" type="checkbox"/> AQM-3.3 | <input type="checkbox"/> AQM-3.8 | <input type="checkbox"/> AQM-3.13 | <input type="checkbox"/> AQM-4.3 | <input type="checkbox"/> AQM-4.8 | <input checked="" type="checkbox"/> AQM-5 | |

36. Check Which Documents are Attached:

- | | |
|---|--|
| <input type="checkbox"/> Coastal Zone Determination | <input type="checkbox"/> Claim of Confidentiality |
| <input type="checkbox"/> Coastal Zone Permit | <input checked="" type="checkbox"/> Manufacturer Specification(s) |
| <input checked="" type="checkbox"/> Proof of Local Zoning | <input type="checkbox"/> Material Safety Data Sheets (MSDSs) |
| <input checked="" type="checkbox"/> Application Fee | <input checked="" type="checkbox"/> Supporting Calculations |
| <input checked="" type="checkbox"/> Advertising Fee | <input checked="" type="checkbox"/> Descriptive Cover Letter |
| <input type="checkbox"/> Applicant Background Information Questionnaire | <input checked="" type="checkbox"/> Other (Specify): Initial Notification for Reg .1144 |

Confidentiality Information

37. Do You Consider Any of the Information Submitted With this Application Confidential? ☐ YES ☒ NO

For help on how to submit a confidentiality claim see

<http://regulations.delaware.gov/register/december2011/final/15%20DE%20Reg%20864%2012-01-11.htm>

If a Claim of Confidentiality is made it MUST meet the requirements of Section 6 of DNREC's Freedom of Information ("FOIA") Regulation at the time the Application is submitted.

Signature Block

I, the undersigned, hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all of its attachments as to the truth, accuracy, and completeness of this information. I certify based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete. By signing this form, I certify that I have not changed, altered, or deleted any portions of this application. I acknowledge that I cannot commence construction, alteration, modification or initiate operation until I receive written approval (i.e. permit, registration, or exemption letter) from the Department. I acknowledge that I may be required to perform testing of the equipment to receive construction or operation approval, and that if I do not receive approval to construct or operate that I may appeal the decision.

Don Phillips

Owner or Operator

2-5-20

Date

Signature of Owner or Operator

One Original and One Copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 W. Water Street, Suite 6A
Dover, Delaware 19904

All Checks Should Be Made Payable To:
State of Delaware

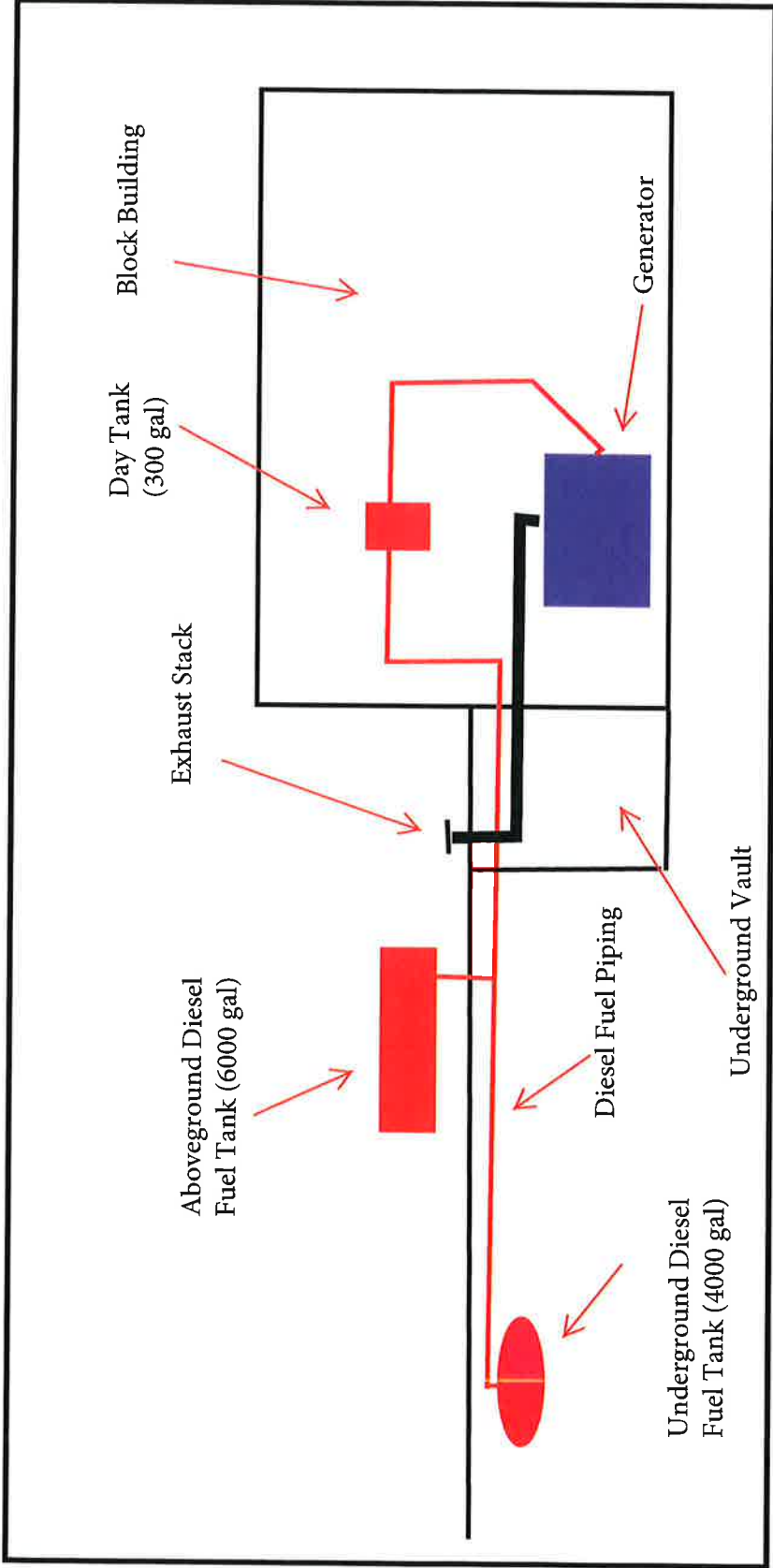


DNREC – Air Quality Management Section
Application to Construct, Operate, or Modify
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Form AQM-2
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Process Flow Diagram

Sketch the Process Flow Diagram for the equipment or process being applied for. Include each emission unit and control device (even existing emission units that will not be modified by this application). You may identify each emission unit with a simple shape. Label each emission unit and control device with a unique identifier. Show the relationship between each emission unit and/or control device by drawing arrows between them to indicate the flow of air pollutants. List which application forms are included for each emission unit or control device below the shape representing each emission unit or control device. See <http://www.delaware.gov/reg2/default.htm> for example Process Flow Diagrams for common processes. If you already have a Process Flow Diagram for the equipment or process being applied for, you may attach it to the application instead of using this form.





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Form AQM-3.3
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Generator/Engine Application

If you are using this form electronically, press F1 at any time for help

General Information	
1.	Facility Name: Energy and Technology Center
2.	Equipment ID: EGEN2
3.	Manufacturer: Cummins
4.	Model: QSK23-G7 NR2
5.	Serial Number: K190684363
6.	Maximum Power Rating of Engine: 1220 horsepower
7.	Standby Power Rating of Generator: 750 kilowatt
8.	Date of Manufacture: 2019
9.	Installation Date: December 2019
10.	Is the Equipment Being Applied For a Generator or an Engine? <input checked="" type="checkbox"/> Generator <input type="checkbox"/> Engine
<i>If the equipment is a Generator, complete the rest of Question 10. If not, proceed to Question 11.</i>	
10.1.	Is the Generator Existing or New? <input type="checkbox"/> Existing <input checked="" type="checkbox"/> New
10.2.	Will the Generator Be Classified as an Emergency Generator or a Distributed Generator? <input checked="" type="checkbox"/> Emergency <input type="checkbox"/> Distributed
10.3.	Has an Initial Notification Pursuant to 7 DE Admin. Code 1144 Been Submitted for this Generator? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
<i>If NO, include a copy of the Initial Notification with this application.</i>	
10.4.	Have the Emissions From the Generator Been Certified to Meet the Currently Applicable US EPA Non-Road Emission Standards? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
<i>If YES, attach a copy of the Manufacturer's Certification. If NO, attach copies of any/all of the following: any maintenance or operating requirements/instructions provided by the generator manufacturer; the type, or a description, of any emission control equipment use; and/or emissions test data for the generator (such as a manufacturer's technical data sheet), any supporting documentation for any emission control equipment used, any supporting calculations, any quality control or assurance information, and any other information needed to demonstrate compliance with the requirements. Proceed to Question 11.</i>	
11.	Primary Fuel: <input type="checkbox"/> Natural Gas <input checked="" type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Biodiesel <input type="checkbox"/> Other (specify):
11.1.	Maximum Annual Primary Fuel Consumption: 25,500 gal
11.2.	Heat Content of Primary Fuel: 137,000 BTU/gal
11.3.	Maximum Firing Rate: 51 gallons/hr
11.4.	Percent Sulfur of Primary Fuel: 0.05 %
12.	Secondary Fuel: <input type="checkbox"/> Natural Gas <input checked="" type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Biodiesel <input checked="" type="checkbox"/> Other (specify): None



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General Information

- 12.1. Maximum Annual Secondary Fuel Consumption: **NA gal**
- 12.2. Heat Content of Secondary Fuel: **NA BTU/gal**
- 12.3. Maximum Firing Rate: **NA gallons/hr**
- 12.4. Percent Sulfur of Secondary Fuel: **NA %**
13. Is SCR/NSCR/SNCR/Ammonia Injection Used: ☐ YES ☐ NO

Stack Information

14. How Does the Process Equipment Vent:
(check all that apply)
☒ Directly to the Atmosphere
☐ Through a Control Device Covered by Forms AQM-4.1 through 4.12
- If any of the process equipment vents directly to the atmosphere proceed to Question 15. If the process equipment vents through a control device, provide the stack parameters on the control device form and proceed to Question 16.*
15. Emission Point Name: **EGEN2**
- 15.1. Stack Height Above Grade: **1 feet**
- 15.2. Stack Exit Diameter: **feet**
(Provide Stack Dimensions If Rectangular Stack)
- 15.3. Is a Stack Cap Present? ☒ YES ☐ NO
- 15.4. Stack Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting
(check all that apply) ☐ Other (Specify):
- 15.5. Stack Exit Gas Temperature: **888 °F**
- 15.6. Stack Exit Gas Flow Rate: **5358 ACFM**
- 15.7. Distance to Nearest Property Line: **130 ft**
- 15.8. Describe Nearest Obstruction: **Two Story Block Utility Building**
- 15.9. Height of Nearest Obstruction: **30 ft**
- 15.10. Distance to Nearest Obstruction: **15 ft**
- 15.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO

Monitoring Information

16. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO
- If Yes, Attach a Copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets**
- If YES, complete the rest of Question 16. If NO, proceed to Question 17.*
- 16.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM₁₀ ☐ PM_{2.5} ☐ NO_x ☐ SO_x ☐ Metals
☐ Other (Specify):
- 16.2. Describe the Continuous Emission Monitoring System:



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Form AQM-3.3
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Monitoring Information

- 16.3. Manufacturer:
- 16.4. Model:
- 16.5. Serial Number:
- 16.6. Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☐ NO
- If YES, complete the rest of Question 16. If NO, proceed to Question 17.*
- 16.7. Emission Units Monitored:
- 16.8. Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? ☐ YES ☐ NO
- If YES, complete the rest of Question 15. If NO, proceed to Question 17.*
- 16.9. Emission Units Emitting Simultaneously:

Visible Emissions Monitoring Information

For Primary Fuel

17. Proposed Technique Used to Monitor Visible Emissions: ☐ Opacity Monitor (COM)
☒ Manual (Method 9)
☐ Manual (Method 22)
☐ Other (Describe):
- If an Opacity Monitor (COM) is used, complete the rest of Question 17. If not, proceed to Question 18.*

17.1. Describe the Continuous Opacity Monitoring System:

17.2. Manufacturer:

17.3. Model:

17.4. Serial Number:

18. Proposed Frequency of Opacity Monitoring: **Annually**

For Secondary Fuel. If no Secondary Fuel is used, proceed to Question 20.

19. Proposed Technique Used to Monitor Visible Emissions: ☐ Opacity Monitor (COMs)
☐ Manual (Method 9)
☐ Manual (Method 22)
☐ Other (Describe):

If an Opacity Monitor (COMs) is used, complete the rest of Question 19. If not, proceed to Question 20.

19.1. Describe the Continuous Opacity Monitoring System:

19.2. Manufacturer:

19.3. Model:

19.4. Serial Number:

20. Proposed Frequency of Opacity Monitoring:



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Voluntary Emission Limitation Request Information

21. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 21. If NO, proceed to Question 22.

21.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

22. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☒ YES ☐ NO

If YES, complete the rest of Question 22. If NO, proceed to Question 23.

22.1. Describe Any Proposed Operating Limitations: **Operations Limited to 500 hours per year.**

Additional Information

23. Is There Any Additional Information Pertinent to this Application? ☒ YES ☐ NO

If YES, complete the rest of Question 23.

22.1. Describe: **See permitting package**



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Emissions Information Application

If you are using this form electronically, press F1 at any time for help

Process Information

1. Number of Individual Pieces of Process Equipment in Process: **1**
2. Number of Individual Control Devices in Process: **2**

Emissions Information for First Emission Point/Stack

3. Emission Point Name: **Emergency Generator #2**
4. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: **EGEN2**
5. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

Pollutant Name (Specify VOCs and HAPs Individually in 5.10 through 5.18)	CAS Number (Not required for 5.1 through 5.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
5.1. Particulate Matter (PM)		0.13 lbs/hour	0.13 lbs/hour	0.03 tons/year	0.03 tons/year
5.2. PM ₁₀		0.13 lbs/hour	0.13 lbs/hour	0.03 tons/year	0.03 tons/year
5.3. PM _{2.5}		0.13 lbs/hour	0.13 lbs/hour	0.03 tons/year	0.03 tons/year
5.4. Sulfur Oxides (SO _x)		0.27 lbs/hour	0.27 lbs/hour	0.07 tons/year	0.07 tons/year
5.5. Nitrogen Oxides (NO _x)		15.79 lbs/hour	15.79 lbs/hour	3.95 tons/year	3.95 tons/year
5.6. Carbon Monoxide (CO)		0.75 lbs/hour	0.75 lbs/hour	0.19 tons/year	0.19 tons/year
5.7. Total Volatile Organic Compounds (VOCs)		0.32 lbs/hour	0.32 lbs/hour	0.08 tons/year	0.08 tons/year
5.8. Total Hazardous Air Pollutants (HAPs)		0.01 lbs/hour	0.01 lbs/hour	0.003 tons/year	0.003 tons/year



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Emissions Information for First Emission Point/Stack

5.9.	CO ₂	1415.2 lbs/hour	1415.2 lbs/hour	354 tons/year	354 tons/year
5.10.	CO _{2e}	1415.2 lbs/hour	1415.2 lbs/hour	354 tons/year	354 tons/year
5.11.		lbs/hour	lbs/hour	tons/year	tons/year
5.12.		lbs/hour	lbs/hour	tons/year	tons/year
5.13.		lbs/hour	lbs/hour	tons/year	tons/year
5.14.		lbs/hour	lbs/hour	tons/year	tons/year
5.15.		lbs/hour	lbs/hour	tons/year	tons/year
6.	Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:				

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Second Emission Point/Stack

7. Emission Point Name: NA					
8. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:					
9. Pollutant Emissions					
If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.					
Pollutant Name (Specify VOCs and HAPs Individually in 9.10 through 9.18)	CAS Number (Not required for 9.1 through 9.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
9.1. Particulate Matter (PM)		lbs/hour	lbs/hour	tons/year	tons/year
9.2. PM ₁₀		lbs/hour	lbs/hour	tons/year	tons/year
9.3. PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year



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Emissions Information for Second Emission Point/Stack

9.4.	Sulfur Oxides (SO _x)	lbs/hour	lbs/hour	tons/year	tons/year
9.5.	Nitrogen Oxides (NO _x)	lbs/hour	lbs/hour	tons/year	tons/year
9.6.	Carbon Monoxide (CO)	lbs/hour	lbs/hour	tons/year	tons/year
9.7.	Total Volatile Organic Compounds (VOCs)	lbs/hour	lbs/hour	tons/year	tons/year
9.8.	Total Hazardous Air Pollutants (HAPs)	lbs/hour	lbs/hour	tons/year	tons/year
9.9.	CO ₂	lbs/hour	lbs/hour	tons/year	tons/year
9.10.	CO _{2e}	lbs/hour	lbs/hour	tons/year	tons/year
9.11.		lbs/hour	lbs/hour	tons/year	tons/year
9.12.		lbs/hour	lbs/hour	tons/year	tons/year
9.13.		lbs/hour	lbs/hour	tons/year	tons/year
9.14.		lbs/hour	lbs/hour	tons/year	tons/year
9.15.		lbs/hour	lbs/hour	tons/year	tons/year

10. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Third Emission Point/Stack

11.	Emission Point Name:	NA
12.	Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:	
13.	Pollutant Emissions	
If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.		



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Emissions Information for Third Emission Point/Stack

Pollutant Name (Specify VOCs and HAPs Individually in 13.10 through 13.18)	CAS Number (Not required for 13.1 through 13.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
13.1. Particulate Matter (PM)		lbs/hour	lbs/hour	tons/year	tons/year
13.2. PM ₁₀		lbs/hour	lbs/hour	tons/year	tons/year
13.3. PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year
13.4. Sulfur Oxides (SO _x)		lbs/hour	lbs/hour	tons/year	tons/year
13.5. Nitrogen Oxides (NO _x)		lbs/hour	lbs/hour	tons/year	tons/year
13.6. Carbon Monoxide (CO)		lbs/hour	lbs/hour	tons/year	tons/year
13.7. Total Volatile Organic Compounds (VOCs)		lbs/hour	lbs/hour	tons/year	tons/year
13.8. Total Hazardous Air Pollutants (HAPs)		lbs/hour	lbs/hour	tons/year	tons/year
13.9. CO ₂		lbs/hour	lbs/hour	tons/year	tons/year
13.10. CO _{2e}		lbs/hour	lbs/hour	tons/year	tons/year
13.11.		lbs/hour	lbs/hour	tons/year	tons/year
13.12.		lbs/hour	lbs/hour	tons/year	tons/year
13.13.		lbs/hour	lbs/hour	tons/year	tons/year
13.14.		lbs/hour	lbs/hour	tons/year	tons/year
13.15.		lbs/hour	lbs/hour	tons/year	tons/year
14. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:					
Attach the Basis of Determination or Calculations for each Emission Rate provided above.					



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Emissions Information for Fourth Emission Point/Stack

15. Emission Point Name: NA					
16. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:					
17. Pollutant Emissions					
If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.					
Pollutant Name (Specify VOCs and HAPs Individually in 17.10 through 17.18)	CAS Number (Not required for 17.1 through 17.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
17.1. Particulate Matter (PM)		lbs/hour	lbs/hour	tons/year	tons/year
17.2. PM ₁₀		lbs/hour	lbs/hour	tons/year	tons/year
17.3. PM _{2.5}		lbs/hour	lbs/hour	tons/year	tons/year
17.4. Sulfur Oxides (SO _x)		lbs/hour	lbs/hour	tons/year	tons/year
17.5. Nitrogen Oxides (NO _x)		lbs/hour	lbs/hour	tons/year	tons/year
17.6. Carbon Monoxide (CO)		lbs/hour	lbs/hour	tons/year	tons/year
17.7. Volatile Organic Compounds (VOCs)		lbs/hour	lbs/hour	tons/year	tons/year
17.8. Total Hazardous Air Pollutants (HAPs)		lbs/hour	lbs/hour	tons/year	tons/year
17.9. CO ₂		lbs/hour	lbs/hour	tons/year	tons/year
17.10. CO _{2e}		lbs/hour	lbs/hour	tons/year	tons/year
17.11.		lbs/hour	lbs/hour	tons/year	tons/year
17.12.		lbs/hour	lbs/hour	tons/year	tons/year
17.13.		lbs/hour	lbs/hour	tons/year	tons/year
17.14.		lbs/hour	lbs/hour	tons/year	tons/year
17.15.		lbs/hour	lbs/hour	tons/year	tons/year



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Emissions Information for Fourth Emission Point/Stack

18. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

If there are more than four Emission Points/Stacks, attach additional copies of this form as needed.

Overall Process Emissions

19. Pollutant Emissions

If more than 15 pollutants are emitted from this Process, attach additional copies of this page as needed.

Pollutant Name (Specify VOCs and HAPs Individually in 19.10 through 19.18)	CAS Number (Not required for 19.1 through 19.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
19.1. Particulate Matter (PM)		0.73 lbs/hour	0.73 lbs/hour	0.18 tons/year	0.18 tons/year
19.2. PM ₁₀		0.73 lbs/hour	0.73 lbs/hour	0.18 tons/year	0.18 tons/year
19.3. PM _{2.5}		0.73 lbs/hour	0.73 lbs/hour	0.18 tons/year	0.18 tons/year
19.4. Sulfur Oxides (SO _x)		0.32 lbs/hour	0.32 lbs/hour	0.08 tons/year	0.08 tons/year
19.5. Nitrogen Oxides (NO _x)		7.83 lbs/hour	7.83 lbs/hour	1.96 tons/year	1.96 tons/year
19.6. Carbon Monoxide (CO)		2.56 lbs/hour	2.56 lbs/hour	0.64 tons/year	0.64 tons/year
19.7. Total Volatile Organic Compounds (VOCs)		2.07 lbs/hour	2.07 lbs/hour	0.52 tons/year	0.52 tons/year
19.8. Total Hazardous Air Pollutants (HAPs)		0.01 lbs/hour	0.01 lbs/hour	0.003 tons/year	0.003 tons/year
19.9. CO ₂		1415.2 lbs/hour	1415.2 lbs/hour	354 tons/year	354 tons/year
19.10. CO _{2e}		1415.2 lbs/hour	1415.2 lbs/hour	354 tons/year	354 tons/year
19.12.		lbs/hour	lbs/hour	tons/year	tons/year



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Overall Process Emissions

19.13.	lbs/hour	lbs/hour	tons/year	tons/year
19.14.	lbs/hour	lbs/hour	tons/year	tons/year
19.15.	lbs/hour	lbs/hour	tons/year	tons/year
20. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above: Emissions are calculated based on 500 hours of operation a year. Calculations are included in Appendix C of the Permitting Package.				

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Minor New Source Review Information

21. Does the Process Have the Potential to Emit More Than Five Tons Per Year of Any Pollutant? ☐ YES ☒ NO
22. Is the Source New or Existing? ☒ NEW ☐ EXISTING
See Question 11 of AQM-1
- If the Process has the Potential to Emit more than five tons per year of any pollutant, and is a New Source, a Control Technology Analysis pursuant to Regulation No. 1125 Section 4 must be conducted and attached to this application.

Major New Source Review Information

23. Does the Process Have the Potential to Emit More Than the Significance Level for Any Pollutant? *(Check All That Apply)*
- ☐ Greater Than 25 Tons Per Year of Particulate Matter (PM)
 - ☐ Greater Than 15 Tons Per Year of PM₁₀
 - ☐ Greater Than 10 Tons Per Year of PM_{2.5}
 - ☐ Greater Than 40 Tons Per Year of Sulfur Dioxide(SO₂)
 - ☐ Greater Than 25 Tons Per Year of Nitrogen Oxides (NO_x) in New Castle and Kent County
 - ☐ Greater Than 100 Tons Per Year of Nitrogen Oxides (NO_x) in Sussex County
 - ☐ Greater Than 100 Tons Per Year of Carbon Monoxide (CO)
 - ☐ Greater Than 25 Tons Per Year of Total Volatile Organic Compounds (VOCs) in New Castle and Kent County
 - ☐ Greater Than 50 Tons Per Year of Total Volatile Organic Compounds (VOCs) in Sussex County
 - ☐ Greater Than 75,000 Tons Per Year of Equivalent Carbon Dioxide (CO_{2e})



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If the Process has the Potential to Emit greater than any of the amounts listed above 7 DE Admin. Code 1125 Sections 2 and/or 3 apply. Contact the Department at (302) 323-4542 or (302) 739-9402 for additional information

Additional Information

24. Is There Any Additional Information Pertinent to this Application? ☒ YES ☐ NO

If YES, complete the rest of Question 24.

24.1. Describe: **See Permitting Package**

Submit by Email

Print Form

**STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
AIR QUALITY MANAGEMENT SECTION**

STATIONARY GENERATOR INITIAL NOTIFICATION

The submittal of this information to the Department satisfies the "Initial Notification" requirement of Regulation No. 1144, Section 1.4. Please submit a separate information form for each generator in order to meet the Initial Notification requirement.

Submit the completed Initial Notification by doing one of the following:
1. Press the **"Submit by Email"** button above or below, and follow the directions given;

2. Print completed form, and fax a copy to **(302) 739-3106**; or

3. Print completed form, and mail the Initial Notification to...

For information about
Regulation No. 1144
"Control of Stationary
Generator Emissions,"
or for help filling out this form,
call Air Quality Management at:

(302) 739-9402

**Air Quality Management, Attention: Reg. 1144 Initial Notification
156 South State Street, Dover, DE 19901**

1. GENERATOR OWNER INFORMATION

First Name: Donald

M.I. :

Last Name: Phillips

Company Name (if applicable): Delmarva Power

Address: PO BOX 9239

City: Newark

State: DE

Zip Code: 19714-9239

Telephone Number: 302-454-4486

2. GENERATOR INFORMATION

Physical address of generator: 500 North Wakefield Drive

City: Newark

State: DE

Zip Code: 19702

Coordinates (if known): Latitude: 39.662859

Longitude: 75.676341

Make: Cummins

Model: QSK23-G7 NR2

Year of Manufacture: 2019

Serial Number: K190684363

Standby Power Rating (kW): 750kW

Prime Power Rating (kW): N/A

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
AIR QUALITY MANAGEMENT SECTION

STATIONARY GENERATOR INITIAL NOTIFICATION (Page 2)

2. GENERATOR INFORMATION (continued)

Engine Horsepower (hp): 1220

Fuel Type: Diesel

Please list or describe any emissions control devices installed on the generator (i.e., any method, process, or equipment which removes or reduces air contaminants discharged into the atmosphere).

Engine Certified to Stationary Emergency U.S.

EPA New Source Performance Standards,

40 CFR 60 subpart IIII Tier 2 exhaust emission

levels. U.S. applications must be applied per

this EPA regulation.

3. DATE OF INSTALLATION

December 2019

This is the date which the emplacement of the generator began, or will begin.
See Regulation No. 1144 for a complete definition of "installation."

4. GENERATOR CLASSIFICATION
(Please choose one)



**Emergency
Generator**

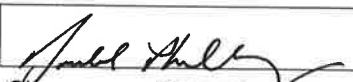


**Distributed
Generator**

An emergency generator may operate only during an emergency (e.g., a power outage, or a significant voltage or frequency deviation), for maintenance, or for testing. A distributed generator may operate for these purposes, as well as for any other non-emergency purpose. See Regulation No. 1144 for complete definitions of these terms.

5. SIGNATURE OF GENERATOR OWNER

I, the undersigned, hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and any of its attachments as to the truth, accuracy, and completeness of this information. I certify based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete. By signing this form, I certify that I have not changed, altered, or deleted any portions of this notification.


Signature of Generator Owner

2-5-20

Date

APPENDIX B – EMERGENCY GENERATOR VENDOR SPECIFICATIONS AND EMISSION FACTORS



Diesel generator set QSK23 series engine

600 kW - 800 kW 60 Hz

Standby **750 kW**



Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby and Prime Power applications.

Features

Cummins heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent Magnet Generator (PMG) - Offers enhanced motor starting and fault clearing short circuit capability.

Circuit breakers - Option for manually-and/or electrically-operated circuit breakers.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency, and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Peer-to-peer paralleling - For applications where two or more generators with PowerCommand 3.3 control can be combined with an electrically operated circuit breaker and a combination of transfer switch(s).

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

Enclosures - Optional weather protective and sound attenuated enclosures are available.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

	Standby rating	Prime rating	Continuous rating	Data sheets
Model	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz
DQCA	600 (750)	545 (681)		D-3352
DQCB	750 (938)	600 (850)		D-3353
DQCC	800 (1000)	725 (906)		D-3354

Our energy working for you.™



Bill of Material

Cummins Sales and Service - East Region
2727 Ford Rd
Bristol PA 19007 United States
Direct: 1-215-826-1211

Diamond Electric
3566 Peachtree Run
Dover DE 19901 United States
Main: (302) 697-3296
Attention: Steve Hill

Project Name: Delmarva Power ETC replacement GEN2

		USD
Item	Description	Qty
	Diesel Genset: 60Hz-750kW	
Install-US-Stat	U.S. EPA, Stationary Emergency Application	1
750DQCB	Genset-Diesel,60Hz,750kW	1
A331-2	Duty Rating-Standby Power	1
L090-2	Listing-UL 2200	1
L228-2	Certification-Seismic, IBC2000, IBC2003, IBC2006, IBC2009, IBC2012	1
L170-2	Emissions Certification, EPA, Tier 2, NSPS CI Stationary Emergency	1
R002-2	Voltage-277/480,3 Phase,Wye,4 Wire	1
B600-2	Alternator-60Hz,3Ph,480V,105/80C-SP	1
H703-2	Generator Set Control-PowerCommand 2.3	1
H536-2	Display Language-English	1
H606-2	Meters-AC Output,Analog	1
H678-2	Display-Control, LCD	1
K020-2	Display, Running Time	1
K631-2	Relays-Genset Status, User Configured	1
KA08-2	Alarm-Audible, Engine Shutdown	1
KU32-2	Relay - Alarm Shutdown	1
KS53-2	Signals - Auxiliary, 8 Inputs/8 Outputs	1
H679-2	Control Mounting-Front Facing	1
KU94-2	CB Right Only	1
KP88-2	CB-1200A,3P,600/690V,UL/IEC,ServEnt,100%UL,Right	1
KB70-2	CB Top Entry, Right	1
C127-2	Separator-Fuel/Water	1
E074-2	Engine Cooling-Radiator, 50C Ambient	1

H527-2	Warning-Low Coolant Level	1
H557-2	Coolant Heater-208/240/480V, Below 40F Ambient Temp	1
D041-2	Engine Air Cleaner-Normal Duty	1
L026-2	Test Record-Certified	1
L023-2	Test Record-Safety Shutdowns	1
L189-2	ST 5YR 2500HR Parts + Labor + Travel	1
L050-2	Literature-English	1
A358-2	Packing-None	1
SPEC-P	Product Revision - P	1
CP01-2	Common Parts Listing	1
0155-2342-04	Muffler,Critical-Side Inlet,End Outlet,12.0"ASA Flange	1
A048G602	Battery Charger-10Amp,120/208/240VAC,12/24V,50/60Hz	1
0541-1657-05	Exhaust Pipe Kit,Flex-8-12",30"L	1
A034C357	Vibration Isolator,Seismic-3400lbs,1.10" Deflection,3100lbs/in Spring Rate	8
0300-5929-02	Annunciator-Panel Mounted With Enclosure (RS485)	1
FOB 5000	Generator Factory Direct Drop ship curbside open truck crane required to offload.	1
TT 5000	Mileage	1
PD 5000	Parts	1
LB 5000	Load Bank labor and equipment fee	1
PT 5000	Personnel training	1
SU 5000	Service Labor	1
PM	5 year Planned maintenance agreement	1

Submitted by

Donald LaPlante III , Senior Sales Representative
donald.a.laplante@cummins.com
Mobile: 1-215-718-4984
Fax: 1-215-785-3921

Generator set specifications

Governor regulation class	ISO8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 61000-4-2: Level 4 electrostatic discharge IEC 61000-4-3: Level 3 radiated susceptibility

Engine specifications

Bore	169.9 mm (6.69 in)
Stroke	169.9 mm (6.69 in)
Displacement	23.15 liters (1413 in ³)
Configuration	Cast iron, in line 6 cylinder
Battery capacity	1400 amps minimum at ambient temperature of 0 °C to 10 °C (32 °F to 50 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element with restriction indicator
Lube oil filter type(s)	Fleet guard dual venturi spin-on, combination full flow and bypass filters
Standard cooling system	High ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Single bearing flexible disc
Insulation system	Class H
Standard temperature rise	125 °C Standby at 40 °C ambient
Exciter type	Permanent Magnet Generator (PMG)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone Influence Factor (TIF)	< 50 per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	< 3%

Available voltages

60 Hz Line-Neutral/Line-Line

- | | | | |
|-----------|-----------|-----------|-----------|
| • 110/190 | • 127/220 | • 230/380 | • 277/480 |
| • 115/200 | • 139/240 | • 240/416 | • 347/600 |
| • 120/208 | • 220/380 | • 255/440 | |

Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- Fuel/water separator
- Heavy duty air cleaner

Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise

- 120/240 V anti-condensation heater
- Temperature sensor - alternator bearing RTD

Control panel

- PC3.3
- PC3.3 with MLD
- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Remote fault signal package
- Run relay package

- Run time display

Cooling system

- 50 °C ambient

Generator set options and accessories (continued)

Exhaust system

- Industrial grade exhaust silencer (12 to 18 dBA)
- Residential grade exhaust silencer (18 to 25 dBA)
- Critical grade exhaust silencer (25 to 35 dBA)
- Super critical exhaust silencer (35 to 45 dBA)

Generator set

- AC entrance box
- Battery
- Battery rack with hold-down
- Circuit breaker - set mounted
- Remote annunciator panel
- Spring isolators

- 2 year warranty
- 5 year warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

PowerCommand 2.3 – control system



PowerCommand 2.3 control - An integrated generator set control system providing voltage regulation, engine protection, generator protection, operator interface, and isochronous governing (optional).

Control - Provides battery monitoring and testing features and smart-starting control system.

InPower™ - PC based service tool available for detailed diagnostics.

PCCNet RS485 - Network interface (standard) to devices such as remote annunciator for NFPA 110 applications.

Control boards - Potted for environmental protection.

Ambient operation - Suitable for operation in ambient temperatures from -40 °C to +70 °C and altitudes to 13,000 feet (5000 meters).

Prototype tested - UL, CSA, and CE compliant.

AC protection

- AmpSentry protective relay
- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload
- Overload warning
- Reverse kW shutdown
- Reverse Var shutdown
- Short circuit protection

Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (over crank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout

- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

Operator/display panel

- Manual off switch
- 128 x 128 alpha-numeric display with push button access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C

Alternator data

- Line-to-Neutral AC volts
- Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kVA, kW, power factor

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature

Other data

- Generator set model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)
- Total kilowatt hours
- Load profile

Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase Line-to-Line sensing
- Configurable torque matching
- Fault current regulation under single or three phase fault conditions

Control functions

- Time delay start and cool down
- Glow plug control (some models)
- Cycle cranking
- PCCNet interface
- (4) Configurable inputs
- (4) Configurable outputs
- Remote emergency stop
- Battle short mode
- Load shed
- Real time clock with exerciser
- Derate

Options

- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand for Windows® remote monitoring software (direct connect)
- AC output analogue meters
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

For further detail on PC 2.3, see document S-1569.

For further detail on PC 3.3, see document S-1570.

Ratings definitions

Emergency Standby Power (ESP):

Applicable for supplying power to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):

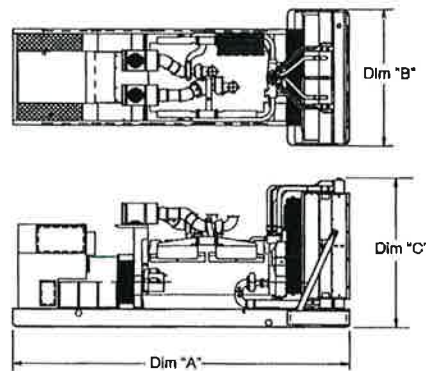
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):

Applicable for supplying power to varying electrical loads for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Dimensions and weights with standard cooling system

Model	Dim 'A' (mm) (in.)	Dim 'B' (mm) (in.)	Dim 'C' (mm) (in.)	Set weight* dry (kg) (lbs)	Set weight* wet (kg) (lbs)
DQCA	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCB	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCC	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)





Dimensions and weights with optional cooling system with seismic feature codes L228-2 and/or L225-2

Model	Dim 'A' (mm) (in.)	Dim 'B' (mm) (in.)	Dim 'C' (mm) (in.)	Set weight* dry (kg) (lbs)	Set weight* wet (kg) (lbs)
DQCA	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCB	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCC	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)

*Weights represent a set with standard features. See outline drawings for weights of other configurations.

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available listed to UL 2200 for all 60 Hz low voltage models, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	U.S. EPA	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
	All low voltage models are CSA certified to product class 4215-01.	International Building Code	The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009, and IBC2012.

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

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Generator Set Data Sheet



Model: DQCB
Frequency: 60 Hz
Fuel Type: Diesel
kW Rating: 750 Standby
 680 Prime
Emissions level: EPA NSPS Stationary Emergency Tier 2

Exhaust emission data sheet:	EDS-1087
Exhaust emission compliance sheet:	EPA-1121
Sound data sheet:	MSP-1159
Sound data sheet – with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHDP):	MSP-1013
Cooling system data in various ambient conditions:	MCP-248
Cooling system data in various ambient conditions – with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHDP):	MCP-174
Prototype test summary data sheet:	PTS-160

Fuel Consumption	Standby				Prime				Continuous
	kW (kVA)				kW (kVA)				kW (kVA)
	Ratings				750 (938)				680 (850)
	Load				1/41/23/4Full				Full
	US gph				16.028.040.051.0				15.025.036.548.0
L/hr	60.6	106.0	151.4	193.1	56.8	94.6	138.2	181.7	

Engine	Standby rating	Prime rating	Continuous rating
Engine manufacturer	Cummins Inc.		
Engine model	QSK23-G7 NR2		
Configuration	Cast Iron, in line, 6 cylinder		
Aspiration	Turbocharged and low temperature after-cooled		
Gross engine power output, kWm (bhp)	910 (1220)	808 (1085)	
BMEP at set rated load, kPa (psi)	2435 (353)	2214 (321)	
Bore, mm (in.)	170 (6.69)		
Stroke, mm (in.)	170 (6.69)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	10.21 (2010)		
Compression ratio	16:1		
Lube oil capacity, L (qt)	102 (108)		
Overspeed limit, rpm	2100		
Regenerative power, kW	93		

Fuel Flow		
Maximum fuel flow, L/hr (US gph)	685 (181)	
Maximum fuel inlet restriction, kPa (in Hg)	13.44 (4)	
Maximum fuel inlet temperature, °C (°F)	71 (160)	

Air	Standby rating	Prime rating	Continuous rating
Combustion air, m ³ /min (scfm)	64 (2242)	62 (2189)	
Maximum air cleaner restriction, kPa (in H ₂ O)	6.2 (25)		
Alternator cooling air, m ³ /min (cfm)	117 (4156)		

Exhaust			
Exhaust flow at set rated load, m ³ /min (cfm)	152 (5358)	146 (5147)	
Exhaust temperature, °C (°F)	476 (888)	458 (856)	
Maximum back pressure, kPa (in H ₂ O)	10.1 (40.8)		

Standard Set-mounted Radiator Cooling (non-seismic)

Ambient design, °C (°F)	50 (122)		
Fan load, kW _m (HP)	24 (32)		
Coolant capacity (with radiator), L (US gal)	109.5 (29)		
Cooling system air flow, m ³ /min (scfm)	1069.8 (37779.6)		
Total heat rejection, MJ/min (Btu/min)	32.3 (30655)	29.6 (28065)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction kPa (in Hg)	30.47 (9)		

Optional Set-mounted Radiator Cooling (with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD))

Ambient design, °C (°F)	50 (122)		
Fan load, kW _m (HP)	27 (36)		
Coolant capacity (with radiator), L (US gal)	89 (23.5)		
Cooling system air flow, m ³ /min (scfm)	1252 (44183)		
Total heat rejection, MJ/min (Btu/min)	32.3 (30655)	29.6 (28065)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction, kPa (in Hg)	30.47 (9)		

Optional Heat Exchanger Cooling

Set coolant capacity, L (US gal)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, aftercooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, aftercooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min)			
Raw water delta P at min flow, jacket water circuit, kPa (psi)			

	Standby rating	Prime rating	Continuous rating
Raw water delta P at min flow, aftercooler circuit, kPa (psi)			
Raw water delta P at min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum fuel return line restriction, kPa (in Hg)			

Optional Remote Radiator Cooling¹

Set coolant capacity, L (US gal)			
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)			
Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum friction head, jacket water circuit, kPa (psi)			
Maximum friction head, aftercooler circuit, kPa (psi)			
Maximum static head, jacket water circuit, m (ft)			
Maximum static head, aftercooler circuit, m (ft)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum fuel flow, L/hr (US gph)			
Maximum fuel return line restriction, kPa (in Hg)			

Weights²

Unit dry weight kgs (lbs)	6075 (13395)
Unit wet weight kgs (lbs)	6337 (13973)

Notes:

¹ For non-standard remote installations contact your local Cummins representative.

² Weights represent a set with standard features. See outline drawing for weights of other configurations.

Derating Factors

Standby	Engine power available up to 1371 m (4497 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 4.4% per 305 m (1000 ft). Above 40 °C (104 °F), derate 10% per 10 °C (18 °F).
Prime	Engine power available up to 1084 m (3555 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 4.5% per 305 m (1000 ft). Above 40 °C (104 °F), derate 20.9% per 10 °C (18 °F).
Continuous	

Ratings Definitions

Emergency Standby Power (ESP):	Limited-Time Running Power (LTP):	Prime Power (PRP):	Base Load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. No sustained overload capability is available at this rating.

Alternator Data

Voltage	Connection ¹	Temp rise degrees C	Duty ²	Single phase factor ³	Max surge kVA ⁴	Winding No.	Alternator data sheet	Feature code
380-480	Wye	125/105	S/P		3313	312	ADS-310	B282-2
220/380	Wye	105/80	S/P		4234	311	ADS-312	B599-2
480	Wye	105/80	S/P		3313	312	ADS-310	B600-2
480	Wye	80	S		3866	312	ADS-311	B601-2
600	Wye	105/80	S/P		3313	7	ADS-310	B603-2
600	Wye	80	S/P		3866	7	ADS-311	B604-2
380	Wye	80	S		4234	312	ADS-312	B660-2
480	Wye	125	P		2944	312	ADS-309	B718-2
600	Wye	125	P		2944	7	ADS-309	B720-2
190-480	Wye	125/105	S/P		2944	311	ADS-309	B720-2
208/416	Wye	105/80	S/P		3866	311	ADS-311	B733-2
208/416	Wye	80	S		4234	311	ADS-312	B734-2
400	Wye	105	S		3866	312	ADS-311	B735-2
480	Wye	125	S		2944	312	ADS-309	B738-2
600	Wye	125	S		2944	7	ADS-309	B739-2
416	Wye	125/105	S/P		3313	312	ADS-310	B741-2

Notes:

¹ Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor³. All single phase ratings are at unity power factor.

² Standby (S), Prime (P) and Continuous ratings (C).

³ Factor for the *Single phase output from Three phase alternator* formula listed below.

⁴ Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

Formulas for Calculating Full Load Currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

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PowerCommand® 2.3 control system



Control system description

The PowerCommand control system is a microprocessor-based generator set monitoring, metering and control system designed to meet the demands of today's engine driven generator sets. The integration of all control functions into a single control system provides enhanced reliability and performance, compared to conventional generator set control systems. These control systems have been designed and tested to meet the harsh environment in which gensets are typically applied.

Features

- 320 x 240 pixels graphic LED backlight LCD.
- Multiple language support.
- AmpSentry™ protective relay - true alternator overcurrent protection.
- Real time clock for fault and event time stamping.
- Exerciser clock and time of day start/stop.
- Digital voltage regulation. Three phase full wave FET type regulator compatible with either shunt or PMG systems.
- Generator set monitoring and protection.
- 12 and 24 VDC battery operation.
- Modbus® interface for interconnecting to customer equipment.
- Warranty and service. Backed by a comprehensive warranty and worldwide distributor service network.
- Certifications - suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE and CSA standards.

PowerCommand digital genset control PCC 2300



Description

The PowerCommand generator set control is suitable for use on a wide range of generator sets in non-paralleling applications. The PowerCommand control is compatible with shunt or PMG excitation style. It is suitable for use with reconnectable or non-reconnectable generators, and it can be configured for any frequency, voltage and power connection from 120-600 VAC Line-to-Line.

Power for this control system is derived from the generator set starting batteries. The control functions over a voltage range from 8 VDC to 30 VDC.

Features

- 12 and 24 VDC battery operation.
- Digital voltage regulation - Three phase full wave FET type regulator compatible with either shunt or PMG systems. Sensing is three phase.
- Full authority engine communications (where applicable) - Provides communication and control with the Engine Control Module (ECM).
- AmpSentry protection - for true alternator overcurrent protection.
- Common harnessing - with higher feature Cummins controls. Allows for easy field upgrades.
- Generator set monitoring - Monitors status of all critical engine and alternator functions.
- Digital genset metering (AC and DC).
- Genset battery monitoring system to sense and warn against a weak battery condition.
- Configurable for single or three phase AC metering.
- Engine starting - Includes relay drivers for starter, Fuel Shut Off (FSO), glow plug/spark ignition power and switch B+ applications.
- Generator set protection - Protects engine and alternator.
- Real time clock for fault and event time stamping.
- Exerciser clock and time of day start/stop.
- Advanced serviceability - using InPower™, a PC-based software service tool.

- Environmental protection - The control system is designed for reliable operation in harsh environments. The main control board is a fully encapsulated module that is protected from the elements.
- Modbus interface for interconnecting to customer equipment.
- Configurable inputs and outputs - Four discrete inputs and four dry contact relay outputs.
- Warranty and service - Backed by a comprehensive warranty and worldwide distributor service network.
- Certifications - Suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE and CSA standards.

Base control functions

HMI capability

Operator adjustments - The HMI includes provisions for many set up and adjustment functions.

Generator set hardware data - Access to the control and software part number, generator set rating in kVA and generator set model number is provided from the HMI or InPower.

Data logs - Includes engine run time, controller on time, number of start attempts, total kWh, and load profile (control logs data indicating the operating hours at percent of rated kW load, in 5% increments. The data is presented on the operation panel based on total operating hours on the generator.)

Fault history - Provides a record of the most recent fault conditions with control date and time stamp. Up to 32 events are stored in the control non-volatile memory.

Alternator data

- Voltage (single or three phase Line-to-Line and Line-to-Neutral)

- Current (single or three phase)

- kW, kVar, power factor, kVA (three phase and total)

- Frequency

Engine data

- Starting battery voltage

- Engine speed

- Engine temperature

- Engine oil pressure

- Engine oil temperature

- Intake manifold temperature

- Comprehensive Full Authority Engine (FAE) data (where applicable)

Service adjustments - The HMI includes provisions for adjustment and calibration of generator set control functions. Adjustments are protected by a password. Functions include:

Service adjustments (continued)

- Engine speed governor adjustments
- Voltage regulation adjustments
- Cycle cranking
- Configurable fault set up
- Configurable output set up
- Meter calibration
- Display language and units of measurement

Engine control

SAE-J1939 CAN interface to full authority ECMs (where applicable). Provides data swapping between genset and engine controller for control, metering and diagnostics.

12 VDC/24 VDC battery operations - PowerCommand will operate either on 12 VDC or 24 VDC batteries.

Temperature dependent governing dynamics (with electronic governing) - modifies the engine governing control parameters as a function of engine temperature. This allows the engine to be more responsive when warm and more stable when operating at lower temperature levels.

Isochronous governing - (where applicable) Capable of controlling engine speed within $\pm 0.25\%$ for any steady state load from no load to full load. Frequency drift will not exceed $\pm 0.5\%$ for a $33\text{ }^{\circ}\text{C}$ ($60\text{ }^{\circ}\text{F}$) change in ambient temperature over an 8 hour period.

Droop electronic speed governing - Control can be adjusted to droop from 0 to 10% from no load to full load.

Remote start mode - It accepts a ground signal from remote devices to automatically start the generator set and immediately accelerate to rated speed and voltage. The remote start signal will also wake up the control from sleep mode. The control can incorporate a time delay start and stop.

Remote and local emergency stop - The control accepts a ground signal from a local (genset mounted) or remote (facility mounted) emergency stop switch to cause the generator set to immediately shut down. The generator set is prevented from running or cranking with the switch engaged. If in sleep mode, activation of either emergency stop switch will wake up the control.

Sleep mode - The control includes a configurable low current draw state to minimize starting battery current draw when the genset is not operating. The control can also be configured to go into a low current state while in auto for prime applications or applications without a battery charger.

Engine starting - The control system supports automatic engine starting. Primary and backup start disconnects are achieved by one of two methods: magnetic pickup or main alternator output frequency. The control also supports configurable glow plug control when applicable.

Cycle cranking - Is configurable for the number of starting cycles (1 to 7) and duration of crank and rest periods. Control includes starter protection algorithms to prevent the operator from specifying a starting sequence that might be damaging.

Time delay start and stop (cooldown) - Configurable for time delay of 0-300 seconds prior to starting after receiving a remote start signal and for time delay of 0-600 seconds prior to shut down after signal to stop in normal operation modes. Default for both time delay periods is 0 seconds.

Alternator control

The control includes an integrated three phase Line-to-Line sensing voltage regulation system that is compatible with shunt or PMG excitation systems. The voltage regulation system is a three phase full wave rectified and has an FET output for good motor starting capability.

Major system features include:

Digital output voltage regulation - Capable of regulating output voltage to within $\pm 1.0\%$ for any loads between no load and full load. Voltage drift will not exceed $\pm 1.5\%$ for a $40\text{ }^{\circ}\text{C}$ ($104\text{ }^{\circ}\text{F}$) change in temperature in an eight hour period. On engine starting or sudden load acceptance, voltage is controlled to a maximum of 5% overshoot over nominal level. The automatic voltage regulator feature can be disabled to allow the use of an external voltage regulator.

Droop voltage regulation - Control can be adjusted to droop from 0-10% from no load to full load.

Torque-matched V/Hz overload control - The voltage roll-off set point and rate of decay (i.e. the slope of the V/Hz curve) is adjustable in the control.

Fault current regulation - PowerCommand will regulate the output current on any phase to a maximum of three times rated current under fault conditions for both single phase and three phase faults. In conjunction with a permanent magnet generator, it will provide three times rated current on all phases for motor starting and short circuit coordination purpose.

Protective functions

On operation of a protective function the control will indicate a fault by illuminating the appropriate status LED on the HMI, as well as display the fault code and fault description on the LCD. The nature of the fault and time of occurrence are logged in the control. The service manual and InPower service tool provide service keys and procedures based on the service codes provided.

Protective functions include:

Battle short mode

When enabled and the *battle short* switch is active, the control will allow some shutdown faults to be bypassed. If a bypassed shutdown fault occurs, the fault code and description will still be annunciated, but the genset will not shutdown. This will be followed by a *fail to shutdown* fault. Emergency stop shutdowns and others that are critical for proper operation are not bypassed. Please refer to the control application guide or manual for list of these faults.

Derate

The derate function reduces output power of the genset in response to a fault condition. If a derate command occurs while operating on an isolated bus, the control will issue commands to reduce the load on the genset via contact closures or modbus.

Configurable alarm and status inputs

The control accepts up to four alarm or status inputs (configurable contact closed or open) to indicate a configurable (customer-specified) condition. The control is programmable for warning, shutdown or status indication and for labeling the input.

Emergency stop

Annunciated whenever either emergency stop signal is received from external switch.

Full authority electronic engine protection

Engine fault detection is handled inside the engine ECM. Fault information is communicated via the SAE-J1939 data link for annunciation in the HMI.

General engine protection

Low and high battery voltage warning - Indicates status of battery charging system (failure) by continuously monitoring battery voltage.

Weak battery warning - The control system will test the battery each time the generator set is signaled to start and indicate a warning if the battery indicates impending failure.

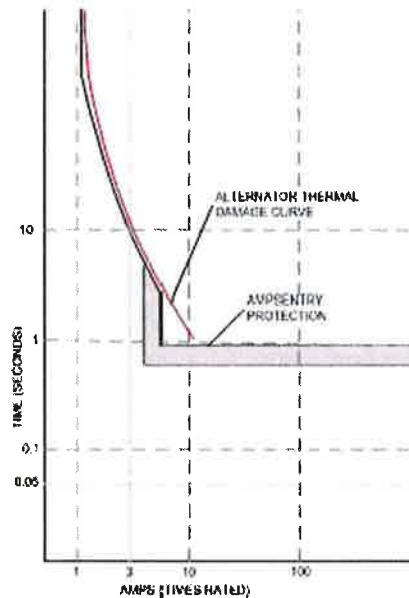
Fail to start (overcrank) shutdown - The control system will indicate a fault if the generator set fails to start by the completion of the engine crank sequence.

Fail to crank shutdown - Control has signaled starter to crank engine but engine does not rotate.

Cranking lockout - The control will not allow the starter to attempt to engage or to crank the engine when the engine is rotating.

Alternator protection

AmpSentry protective relay - A comprehensive monitoring and control system integral to the PowerCommand Control System that guards the electrical integrity of the alternator and power system by providing protection against a wide array of fault conditions in the generator set or in the load. It also provides single and three phase fault current regulation so that downstream protective devices have the maximum current available to quickly clear fault conditions without subjecting the alternator to potentially catastrophic failure conditions. See document R1053 for a full size time over current curve.



High AC voltage shutdown (59) - Output voltage on any phase exceeds preset values. Time to trip is inversely proportional to amount above threshold. Values adjustable from 105-125% of nominal voltage, with time delay adjustable from 0.1-10 seconds. Default value is 110% for 10 seconds.

Low AC voltage shutdown (27) - Voltage on any phase has dropped below a preset value. Adjustable over a range of 50-95% of reference voltage, time delay 2-20 seconds. Default value is 85% for 10 seconds. Function tracks reference voltage. Control does not nuisance trip when voltage varies due to the control directing voltage to drop, such as during a V/Hz roll-off during synchronizing.

Under frequency shutdown (81 u) - Generator set output frequency cannot be maintained. Settings are adjustable from 2-10 Hz below reference governor set point, for a 5-20 second time delay. Default: 6 Hz, 10 seconds.

Under frequency protection is disabled when excitation is switched off, such as when engine is operating in idle speed mode.

Over frequency shutdown/warning (81 o) - Generator set is operating at a potentially damaging frequency level. Settings are adjustable from 2-10 Hz above nominal governor set point for a 1-20 second time delay. Default: 6 Hz, 20 seconds, disabled.

Overcurrent warning/shutdown - Thresholds and time delays are configurable. Implementation of the thermal damage curve with instantaneous trip level calculated based on current transformer ratio and application power rating.

Loss of sensing voltage shutdown - Shutdown of generator set will occur on loss of voltage sensing inputs to the control.

Field overload shutdown - Monitors field voltage to shutdown generator set when a field overload condition occurs.

Over load (kW) warning - Provides a warning indication when engine is operating at a load level over a set point. Adjustment range: 80-140% of application rated kW, 0-120 second delay. Defaults: 105%, 60 seconds.

Reverse power shutdown (32) - Adjustment range: 5-20% of standby kW rating, delay 1-15 seconds. Default: 10%, 3 seconds.

Reverse Var shutdown - Shutdown level is adjustable: 15-50% of rated Var output, delay 10-60 seconds. Default: 20%, 10 seconds.

Short circuit protection - Output current on any phase is more than 175% of rating and approaching the thermal damage point of the alternator. Control includes algorithms to protect alternator from repeated over current conditions over a short period of time.

Field control interface

Input signals to the PowerCommand control include:

- Coolant level (where applicable)
- Fuel level (where applicable)
- Remote emergency stop
- Remote fault reset
- Remote start
- Battleshort
- Rupture basin
- Start type signal
- Configurable inputs - Control includes (4) input signals from customer discrete devices that are configurable for warning, shutdown or status indication, as well as message displayed

Output signals from the PowerCommand control include:

- Load dump signal: Operates when the generator set is in an overload condition.
- Delayed off signal: Time delay based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 – 120 seconds. Default: 0 seconds.

- Configurable relay outputs: Control includes (4) relay output contacts (3 A, 30 VDC). These outputs can be configured to activate on any control warning or shutdown fault as well as ready to load, not in auto, common alarm, common warning and common shutdown.

- Ready to load (generator set running) signal: Operates when the generator set has reached 90% of rated speed and voltage and latches until generator set is switched to off or idle mode.

Communications connections include:

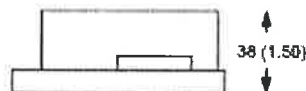
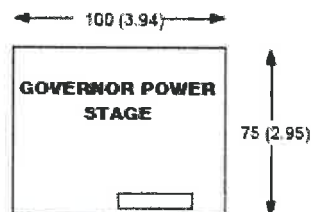
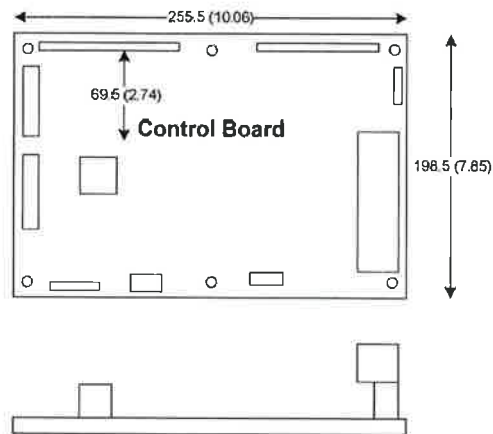
- PC tool interface: This RS-485 communication port allows the control to communicate with a personal computer running InPower software.

- Modbus RS-485 port: Allows the control to communicate with external devices such as PLCs using Modbus protocol.

Note - An RS-232 or USB to RS-485 converter is required for communication between PC and control.

- Networking: This RS-485 communication port allows connection from the control to the other Cummins products.

Mechanical drawings



PowerCommand Human Machine Interface HMI320



Description

This control system includes an intuitive operator interface panel that allows for complete genset control as well as system metering, fault annunciation, configuration and diagnostics. The interface includes five genset status LED lamps with both internationally accepted symbols and English text to comply with customer's needs. The interface also includes an LED backlit LCD display with tactile feel soft-switches for easy operation and screen navigation. It is configurable for units of measurement and has adjustable screen contrast and brightness.

The run/off/auto switch function is integrated into the interface panel.

All data on the control can be viewed by scrolling through screens with the navigation keys. The control displays the current active fault and a time-ordered history of the five previous faults.

Features

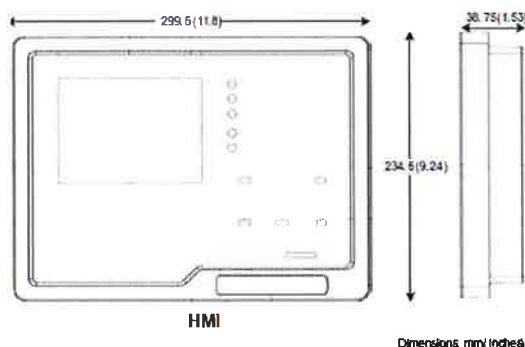
- LED indicating lamps:
 - Genset running
 - Remote start
 - Not in auto
 - Shutdown
 - Warning
 - Auto
 - Manual and stop
- 320 x 240 pixels graphic LED backlight LCD.
- Four tactile feel membrane switches for LCD defined operation. The functions of these switches are defined dynamically on the LCD.
- Seven tactile feel membrane switches dedicated screen navigation buttons for up, down, left, right, ok, home and cancel.
- Six tactile feel membrane switches dedicated to control for auto, stop, manual, manual start, fault reset and lamp test/panel lamps.

- Two tactile feel membrane switches dedicated to control of circuit breaker (where applicable).
- Allows for complete genset control setup.
- Certifications: Suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE and CSA standards.
- LCD languages supported: English, Spanish, French, German, Italian, Greek, Dutch, Portuguese, Finnish, Norwegian, Danish, Russian and Chinese Characters.

Communications connections include:

- PC tool interface - This RS-485 communication port allows the HMI to communicate with a personal computer running InPower.
- This RS-485 communication port allows the HMI to communicate with the main control board.

Mechanical drawing



Software

InPower (beyond 6.5 version) is a PC-based software service tool that is designed to directly communicate to PowerCommand generator sets and transfer switches, to facilitate service and monitoring of these products.

Environment

The control is designed for proper operation without recalibration in ambient temperatures from -40 °C to +70 °C (-40 °F to 158 °F) and for storage from -55 °C to +80 °C (-67 °F to 176 °F). Control will operate with humidity up to 95%, non-condensing.

The HMI is designed for proper operation in ambient temperatures from -20 °C to +70 °C (-4 °F to 158 °F) and for storage from -30 °C to +80 °C (-22 °F to 176 °F).

The control board is fully encapsulated to provide superior resistance to dust and moisture. Display panel has a single membrane surface, which is impervious to effects of dust, moisture, oil and exhaust fumes. This panel uses a sealed membrane to provide long reliable service life in harsh environments.

The control system is specifically designed and tested for resistance to RFI/EMI and to resist effects of vibration to provide a long reliable life when mounted on a generator set. The control includes transient voltage surge suppression to provide compliance to referenced standards.

Certifications

PowerCommand meets or exceeds the requirements of the following codes and standards:

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4: 1993 compliance, controls and switchgear.
- CE marking: The control system is suitable for use on generator sets to be CE-marked.
- EN50081-1,2 residential/light industrial emissions or industrial emissions.
- EN50082-1,2 residential/light industrial or industrial susceptibility.
- ISO 7637-2, level 2; DC supply surge voltage test.
- Mil Std 202C, Method 101 and ASTM B117: Salt fog test.
- UL 508 recognized or Listed and suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance
- CSA 22.2 No. 14 M91 industrial controls.
- PowerCommand control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.

Warranty

All components and subsystems are covered by an express limited one year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available.



**For more information contact your local Cummins distributor
or visit power.cummins.com**

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Circuit breakers



Description

This data sheet provides circuit breaker manufacturer part numbers and specifications. The circuit breaker box description is the rating of that breaker box installation on a Cummins® generator. Please refer to the website of the circuit breaker manufacturer for breaker specific ratings and technical information.

Applicable models

Engine	Models			
QSK19-G8	DQPAA	DQPAB		
QSK23-G7	DQCA	DQCB	DQCC	
QST30-G5	DQFAA	DQFAB	DQFAC	DQFAD
QST30-G17	DQFAE	DQFAF	DQFAG	DQFAH
QSK50-G5	DQGAE	DQGAF		
QSK50-G4	DQGAA	DQGAB		
QSK50-G8	DQGAR	DQGAS		
QSK60-G6	DQKAD	DQKAE	DQKAA	DQKAB
QSK60-G14	DQKAF			
QSK60-G16	DQKAK	DQKAL		
QSK60-G17	DQKAM			

Instructions

1. Locate the circuit breaker feature code or part number and use the charts below to find the corresponding manufacturer circuit breaker catalog number.
2. Use the first letter of the circuit breaker catalog number to determine the "frame" of the breaker. If the first letter is an "N", use the second letter. Then follow the corresponding website link from the table below to find the breaker catalog number description.

Please refer to the catalog numbering systems page, which is given in the chart, to understand the nomenclature of the catalog number.

Frame	Catalog Name*	Catalog Number description pages
P and R	0612CT0101 http://www.schneider-electric.us/en/download/document/0612CT0101/	16-17
L	0611CT1001 http://www.schneider-electric.us/en/download/document/0611CT1001/	8-9
MasterPact NT/NW	http://www.schneider-electric.us/en/faqs/FA231180/	Please refer to PLS007 Rev 25

*The following link may also be used to search specifically by the breaker part number or for the catalog name listed above.

<http://products.schneider-electric.us/technical-library/>

3. Search the catalog by using the first 3 letters of the breaker catalog number and the first 5 numbers to find information such as trip curves, accessories, and dimensional details regarding the circuit breaker.

*If the catalog number starts with "N", skip the N and begin your search with the second letter.

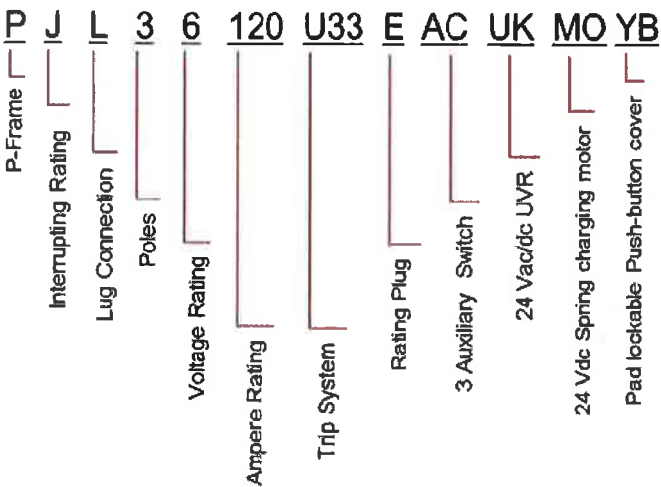
*If the first 3 letters are "PJP," the search will not work. You will need to start with just "PJ" and use the description pages to obtain the information you are looking for on the "PJP."

Example

After finding your circuit breaker catalog number to be "PJL36120U33EACUKMOYB," navigate to the P-frame catalog by using the link provided.

Look at pages 16-17 of the pdf catalog to find the nomenclature of the breaker.

Search the P-frame spec sheet using the search "PJL36120."



The following link is another way to decode the Schneider products

https://www.productinfo.schneider-electric.com/products-us/digest/view/561d5c95e4b0c5641a247b42561d5f5aed60c5c41a24450c?_17707021_83351#_17707021_83351

For decoding the ABB breakers, see the decoder sheet, titled "T8 Catalog number explanation"

Mechanically operated breakers							
Feature Code	Breaker box description	Cummins part #	Engine	Manufacturer	Breaker catalog number	Trip unit	Plug type
KP82-2	CB-2500, Right, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2164-01	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36250U31F	MicroLogic 3.0 LI	F
		A054K364	QSK19-G8, QSK23-G7		RLF36250U33F	MicroLogic 5.0 LSI	
KP83-2	CB-2500A, Left, 3P, 600, IEC 415, UL Serv Ent, 100%	0320-2164-01	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36250U31F	MicroLogic 3.0 LI	F
		A054K364	QSK19-G8, QSK23-G7		RLF36250U33F	MicroLogic 5.0 LSI	
KP84-2	CB-2000, Right, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2164-02	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36200U31F	MicroLogic 3.0 LI	F
		A054K366	QSK19-G8, QSK23-G7		RLF36200U33F	MicroLogic 5.0 LSI	
KP85-2	CB-2000, Left, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2164-02	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36200U31F	MicroLogic 3.0 LI	F
		A054K366	QSK19-G8, QSK23-G7		RLF36200U33F	MicroLogic 5.0 LSI	
KP86-2	CB-1600A, Right, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2164-03	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, 50L, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36160U31F	MicroLogic 3.0 LI	F
		A054K368	QSK19-G8, QSK23-G7		RLF36160U33F	MicroLogic 5.0 LSI	
KP87-2	CB-1600, Left, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2164-03	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36160U31F	MicroLogic 3.0 LI	F
		A054K368	QSK19-G8, QSK23-G7		RLF36160U33F	MicroLogic 5.0 LSI	
KP88-2	CB-1200, Right, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2183	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36120U31E	MicroLogic 3.0 LI	E
		A054K408	QSK19-G8, QSK23-G7		PJP36120U33F	MicroLogic 5.0 LSI	
KP89-2	CB-1200, Left, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2183	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36120U31E	MicroLogic 3.0 LI	E
		A054K408	QSK19-G8, QSK23-G7		PJP36120U33F	MicroLogic 5.0 LSI	
KP90-2	CB-800A, Right, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2182	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36080U31F	MicroLogic 3.0 LI	F
		A054K405	QSK19-G8, QSK23-G7		PJP36080U33F	MicroLogic 5.0 LSI	
KP91-2	CB-800A, Left, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2182	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36080U31F	MicroLogic 3.0 LI	F
		A054K405	QSK19-G8, QSK23-G7		PJP36080U33F	MicroLogic 5.0 LSI	
KP92-2	CB-800A, Right, 3P, UL 600, IEC 690, UL Serv Ent, 100%	A044T468	QSK19-G8, QSK23-G7, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S LSI	N/A
KP93-2	CB-800A, Left, 3P, UL 600, IEC 690, UL Serv Ent, 100%	A044T468	QSK19-G8, QSK23-G7, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S LSI	N/A
KU62-2	CB-3000A, 3P, 600/690V, UL/IEC, ServEnt, 100%UL, Right	A029B150	QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36300U31A	MicroLogic 3.0 LI	F
KU68-2	CB-3000A, 3P, 600/690V, UL/IEC, ServEnt, 100%UL, Left	A029B150	QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36300U31A	MicroLogic 3.0 LI	F

Specification Sheet



Battery and Accessories



Battery Specifications

Battery Part Number	Group Size	CCA	Reserve Capacity	Battery	Voltage	Length	Width	Height	Ship Weight lbs	Quarts Electrolyte
0416-1332	22NF	420	60	Dry	12	9.0	8.8	5.4	19	4.0
0416-0579	24	420	70	Dry	12	10.2	6.6	8.9	20	6.0
0416-0579-01	24	420	70	Wet	12	10.2	6.6	8.9	36	6.0
0416-1330	24XL	810	146	Wet	12	10.3	9.0	6.6	43	5.9
0416-1051	26	530	80	Wet	12	8.2	6.8	8.1	31	3.7
0416-0823	30H	725	150	Dry	12	13.0	6.8	9.3	42	4.2
0416-1040	31	800	160	Dry	12	13.0	6.8	9.4	65	4.2
0416-0796	31	725	150	Wet	12	12.7	6.0	9.3	62	4.2
0416-0980	31	1000	185	Wet	12	13.0	6.8	9.5	59	4.2
A045P632	34	850	NA	Wet	12	10.3	6.6	8.0	NA	NA
0416-1291	34	800	100	Sealed	12	10.0	6.9	7.9	38	4.0
A030Y976	4D	1050	290	Wet	12	20.7	8.7	10.0	100	NA
0416-0848	4D	1080	270	Dry	12	20.8	8.6	9.6	85	13.0
0416-0439	8D	1400	430	Dry	12	20.8	10.7	9.5	110	16.0
0416-1264	8D	730	420	Dry	12	20.7	10.8	9.5	110	16.0
0416-1105	8D	1400	430	Wet	12	20.8	10.8	9.5	125	16.0

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Application – Diesel

Listed below, by set model, is the specific battery size designed to fit the skid mounted battery rack (larger batteries, if required, may not fit the standard skid mounted rack.)

Model	Current Spec	Battery Size*	Supported Part Number*	Battery CCA*	Genset Minimum CCA	Battery Voltage	Starting (Genset) Voltage	Required Battery Quantity
C10 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C15 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C20 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C25 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C30 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C35 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C40 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C50 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C50 D6C	B	34	0416-1291	810	1700	12	12	2
C60 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C60 D6C	B	34	0416-1291	810	1700	12	12	2
C80 D6C	B	34	0416-1291	810	1700	12	12	2
C100 D6C	B	34	0416-1291	810	1700	12	12	2
C125 D6C	B	34	0416-1291	810	1700	12	12	2
C3000 D6	A	8D	0416-0439	1400	1400	12	24	6
C3000 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3250 D6	A	8D	0416-0439	1400	1400	12	24	6
C3250 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3500 D5	A	8D	0416-0439	1400	1400	12	24	6
C3500 D5E	A	8D	0416-0439	1400	1400	12	24	6
C3500 D6	A	8D	0416-0439	1400	1400	12	24	6
C3500 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3750 D5	A	8D	0416-0439	1400	1400	12	24	6
C3750 D5E	A	8D	0416-0439	1400	1400	12	24	6
DQCA	P	8D	0416-0439	1400	1400	12	24	2
DQCB	P	8D	0416-0439	1400	1400	12	24	2
DQCC	P	8D	0416-0439	1400	1400	12	24	2
DQDAA	L	4D	A030Y976	1050	750	12	24	2
DQDAB	K	4D	A030Y976	1050	750	12	24	2
DQDAC	K	4D	A030Y976	1050	750	12	24	2
DQFAA	J	8D	0416-0439	1400	1800	12	24	2
DQFAB	J	8D	0416-0439	1400	1800	12	24	2
DQFAC	J	8D	0416-0439	1400	1800	12	24	2
DQFAD	J	8D	0416-0439	1400	1800	12	24	2
DQFAH	D	8D	0416-0439	1400	1800	12	24	2
DQGAA	C	8D	0416-0439	1400	1400	12	24	4
DQGAB	C	8D	0416-0439	1400	1400	12	24	4
DQGAH	E	8D	0416-0439	1400	1800	12	24	4
DQGAF	E	8D	0416-0439	1400	1800	12	24	4
DQHAB	H	8D	0416-0439	1400	1400	12	24	4

* First line refers to *standby* battery size and the second line refers to *cold starting* battery size for C10 D6 – C60 D6.



Battery Charger

A048G602 10 A 50/60 Hz

A051H785 20 A 50/60 Hz



Description

Cummins® fully automatic battery chargers are constant voltage/constant current chargers incorporating a 4-stage charging algorithm. Designed for use in applications where battery life and reliability are important; these chargers, complete with built-in equalize charge capability, are ideal for stationary or portable starting battery charging service.

To achieve optimum battery life, a 4-stage charging cycle is implemented. The four charging stages are constant current, high-rate taper charge, finishing charge, and maintaining charge. During the constant current cycle the charger operates at maximum possible output in the fast charge mode. During the high-rate taper charge cycle the charger stays at fast charge voltage level until battery current acceptance falls to a portion of the chargers rated output. During the finishing charge cycle the charger operates at the float voltage and completes the battery charge. During the maintaining charge cycle the charger supplies only a few milliamps required by the battery to stay at peak capability.

An optional temperature sensor (A043D534) may be used to adjust charging voltage based on temperature of the battery. Use of a battery temperature sensor helps to increase battery life by preventing over or under charging. The battery temperature sensor also protects the battery from overheating. Temperature compensation sensor is required for all applications when battery charger and battery are located in different temperature or battery heater is being used.

Battery chargers are field-configurable for charging either 12 or 24 VDC battery systems at 50/60 Hz operation. Simple jumper selectors enable selection of output voltage and battery type.

Features

Protection – Surge protected to IEEE and EN standards. All models include single pole cartridge type fuses mounted on the printed circuit board to protect against input or output overcurrent.

Easy Installation – Clearly marked terminal blocks and panel knockouts provide convenient connections of input and output leads.

User Display – Output voltage and current, fault information and status are indicated on the front panel. Includes precision ammeter and voltmeter.

Monitoring – Status LED indicators are provided to show the condition of the charger. LED's on the right side of the monitor indicate operational functions for Temperature Compensation active (Green), AC on (Green), Float (Green) or Boost (Amber) mode, as well as Battery Fault (Red). LED's on the left side of the monitor illuminate (in Red) when Charger fail, High or Low VDC or AC fail occur.

Adjustable Float Voltage – Float voltage can be set, using easy to understand jumpers, for optimum battery performance and life.

Construction – NEMA-1 (IP20) corrosion resistant aluminium enclosure designed for wall mounting.

Faults – The charger senses and annunciates the following fault conditions: AC power loss, battery overvoltage, battery under voltage, battery fault conditions and charger failure. Includes an individual 30 volt/2 amp isolated contact for each alarm.

Vibration Resistant Design – complies with UL991 class B vibration resistance requirements.

Listed – C-UL listed to UL 1236 CSA standard 22.2 No 107.2-M89. Suited for flooded and AGM lead acid and NiCd batteries in generator set installations.

Warranty – 5 year CPG warranty.



Status and Fault LED



Field Selectable Jumper

Specifications

Performance and Physical Characteristics

Output:	Nominal voltage	12VDC* or 24VDC
	Float voltage – 12VDC batteries	12.87, 13.08, 13.31, 13.50*, 13.62, 14.30
	Float voltage – 24VDC batteries	25.74, 26.16, 26.62, 27.00*, 27.24, 28.60
	Equalize-voltage	6.5% above float voltage sensing
	Output voltage regulation	±0.5% (1/2%) line and load regulation
	Maximum output current	10 or 20 amps nominal
	Equalize charging	Battery interactive auto-boost
Input:	Voltage AC	120, 208, 240 ±10%
	Frequency	60/50 Hz +5%
Approximate net weight:		10A: 25 lbs. (11.36 Kg) 20A: 50 lbs. (22.68 Kg)
Approximate dimensions: height x width x depth-in		10A: 12.50" x 7.66" x 6.50"(318 x 195 x 165 mm) 20A: 13.06" x 13.95" x 6.83"(332 x 354 x 173 mm)
Ambient temperature operation: At full rated output -		- 4 °F to 104 °F (-20 °C to 45 °C)

Note:

- Battery charger comes with default settings of 12VDC and 13.50/27.00VDC float voltage and can be changed to the battery manufacture recommendations. Replacement printed circuit board and fuses are identified in the Owner's Manual (10A: A050S537 and 20A: A051X126) which resides in Quick Serve On-Line. Service parts can be purchased through the Memphis Distribution Center. The PC board replacement instruction sheet (10A: A052N073, 20A: A053W929) and service manual (A050D829) is also available.
- Installation and application must comply with "section 4.5.3 batteries and battery charger" of application guide T-030 (Liquid Cooled Generator Set Application Manual A040S369).

Caution:

- Higher input voltages (i.e. 480VAC or 600VAC) can be applied if a transformer with a 120VAC-240VAC output is installed. Higher input voltages (i.e. 480VAC or 600VAC) can be applied if a transformer with a 120VAC-240VAC output is installed. For voltages higher than 240 VAC, stepdown transformer must be used. Review the respective Owner/Installation manual A050S537 for 10Amp and A051X126 20A chargers for supplier recommended stepdown transformer requirements.
- 10Amp battery charger is recommended for genset applications with 1 or 2 factory provided batteries. 20Amp battery charger is recommended for Cummins Genset applications with 3 or 4 factory provided batteries. Please consider the auxiliary DC loads connected to the genset batteries and size this charger as per the T-030 application guide to prevent misapplication issues.
- Back feed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.
- For professional use only. Must be installed by a qualified service technician. Improper installation presents hazards of electrical shock and improper operation, resulting in severe personal injury and/or property damage.
- Use this charger for charging LEAD-ACID or LIQUID ELECTROLYTE NICKEL-CADMIUM batteries only. Do not use this battery charger for charging dry cells, alkaline, lithium, nickel-metal hydride, or sealed nickel-cadmium batteries that are commonly used with home appliances. These batteries may burst and cause injuries to persons and damage to property.
- Do not parallel these battery chargers with any other charging system.

For more information contact your local Cummins distributor
or visit power.cummins.com

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Exhaust Accessories

Exhaust Rain Caps

Stainless steel clamp, aluminized steel cap, and brass bushing hinge to help prevent dirt, dust, debris, snow, and rain from falling into exhaust pipes.

Part Number	Size
0155-0985	Up to 2.25
0155-0986	2.25 – 3.25"
0155-0987	3.25 – 4.50"
0155-1109	5.75 – 6.50"
0155-1110	6.50 – 7.00"
0155-1111	8.00 – 8.75"
0155-1874	10.75"

Premium Rain Caps

Cast aluminum, stainless bolt, and brass bushing hinge.

Part Number	Size
0155-2062-08	2.25"
0155-2062-14	2.38"
0155-2062-01	2.50"
0155-2062-09	2.63"
0155-2062-11	2.75"
0155-2062-03	3.00"
0155-2062-10	3.13"
0155-2062-02	3.50"
0155-2062-07	4.00"
0155-2062-04	4.50"
0155-2062-05	5.00"
0155-2062-06	6.00"

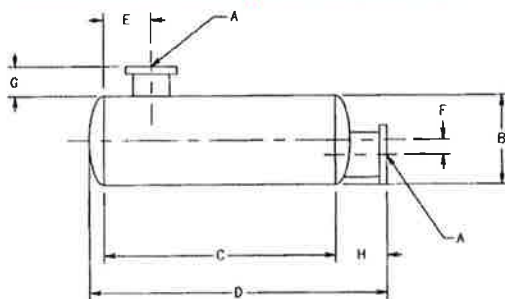
Rain Shield Kits

Helps prevent rain or snow from entering housing between roof panel and muffler tailpipe.

Part Number	Nominal Pipe Size
0155-2862-01	2.0"
0155-2862-02	2.5"
0155-2862-03	3.0"
A035P301	3.5"
A035P322	5.0"
A035P310	6.0"
A035P321	7.5"
A035P320	8.0"

Model	Engine Exhaust Outlet	Muffler In & Out	Qty	Side End Inlet/End Outlet			Side Center Inlet/End Outlet			End Inlet/End Outlet			End Inlet Pipe Package
				Industrial	Residential	Critical	Industrial	Residential	Critical	Industrial	Residential	Critical	
C10D6	2" NPT	-	1	0155-2340-09	0155-2341-09	0155-2342-09				0155-2063-09	0155-2064-09	0155-2065-09	0155-2802
C15D6													
C20D6													
C25D6													
C30D6													
C35D6			1	0155-2340-07	0155-2341-07	0155-2342-07				0155-2063-02	0155-2064-02	0155-2065-02	0155-2707
C40D6													
C50D6													
C60D6													
C80D6													
DPEJ	-	8" ASA	1	0155-2340-02	0155-2341-03	0155-2342-03					0155-2064-07	-	-
DPEK	-	10" ASA		0155-2340-03									
DOCA	-	10" ASA	1	0155-2340-03	0155-2341-03	0155-2342-03							
DOCB	-	12" ASA	1	0155-2340-03	0155-2341-03	0155-2342-03							
DOCC	-												
DODAA	-	6" ASA	1	0155-2340-01	0155-2341-01	0155-2342-01				0155-2063-06	0155-2064-06	0155-2065-06	0541-1236
DODAB	-												
DODAC	-												
DOFAA	-	8" ASA	1	0155-2340-02	0155-2341-02	0155-2342-02							0155-2553
DOFAB	-												
DOFAC	-												
DOFAD	-	10" ASA	1	0155-2340-03	0155-2341-03	0155-2342-03							0155-2554
DOGAA	-												
DOGAB	-												
DOGAE	-	10" ASA	1	0155-2340-03	0155-2341-03	0155-2342-03							
DOGAF	-												
DOGAG	-												
DOGAH	-												
DOGAJ	-												
DOGAK	-												
DOGAM	-												
DOGAN	-	6" ASA	1	0155-2340-01	0155-2341-01	0155-2342-01							0541-1236
DOHAB	-	8" ASA	1										0541-1676
DOKAA	-	14" ASA	1										0541-1204
DOKAB	-												
DOKAD	-												
DOKAE	-												
DOKAF	-												
DOKAG	-	14" ASA	1		0155-2341-10	0155-2342-10			0155-2696-07				0541-1204
DOKAH	-												
DOKAJ	-												
DOKAN	-												
DOLC	-												
DOLD	-	14" ASA	1		0155-2341-10	0155-2342-10							
DOLE	-												
DOLF	-												
DOPAA	-	8" ASA	1	0155-2340-02	0155-2341-03	0155-2342-03							0541-1657-06
DOPAB	-	10" ASA	1										0541-1657-07
DSGAB	4" NPT	5" ASA	1	0155-2340-06	0155-2341-06	0155-2342-06				0155-2063-04	0155-2064-04	0155-2065-05	0543-0052
DSGAC	4" NPT	5" ASA	1	0155-2340-05	0155-2341-05	0155-2342-05				0155-2063-05	0155-2064-04	0155-2065-05	0543-0052
DSGAD	-	5" ASA	1		0155-2341-05	0155-2342-05				0155-2063-05	0155-2064-05	0155-2065-05	0543-0052
DSGAE	-	5" ASA	1	0155-2340-05	0155-2341-05	0155-2342-05				0155-2063-05	0155-2064-06	0155-2065-06	A045F349
DSHAD	-	6" ASA	1		0155-2341-05	0155-2342-05				0155-2063-05	0155-2064-05	0155-2065-05	0155-2621

Off-Center Side Inlet Mufflers



Industrial – Attenuation Levels 12-18 dBa

Part Number	Dimensions								Weight (lbs)
	A	B	C	D	E	F	G	H	
0155-2340-01	6.0" ASA Flange	14.1	27.0	34.5	5.0	0	4.0	6.0	67
0155-2340-02*	8.0" ASA Flange	18.1	46.0	53.2	8.0	0	4.0	3.9	154
0155-2340-03*	10.0" ASA Flange	22.1	44.0	54.3	9.0	0	4.0	6.4	210
0155-2340-04*	12.0" ASA Flange	22.1	59.0	69.3	11.0	0	4.0	5.9	262
0155-2340-05	5.0" ASA Flange	12.1	31.0	32.5	4.0	0	4.0	4.7	62
0155-2340-06	4.0" NPT	9.0	30.0	35.4	4.0	0	3.0	3.7	34
0155-2340-07	3.0" NPT	8.5	29.0	33.6	3.0	0	3.0	3.1	24
0155-2340-08	2.5" NPT	8.1	26.0	29.9	3.0	0	2.5	3.1	22
0155-2340-09	2.0" NPT	7.6	21.0	24.5	2.5	0	2.0	2.1	14

Residential – Attenuation Levels 18-35 dBa

Part Number	Dimensions								Weight (lbs)
	A	B	C	D	E	F	G	H	
0155-2341-01	6.0" ASA Flange	14.1	54.0	61.5	5.0	3.0	4.0	5.7	110
0155-2341-02*	8.0" ASA Flange	22.1	50.0	60.3	8.0	0	4.0	7.0	207
0155-2341-03*	10.0" ASA Flange	22.1	78.1	88.3	8.0	0	4.0	6.9	295
0155-2341-04**	12.0" ASA Flange	26.1	72.0	83.4	9.0	0	4.0	7.5	363
0155-2341-05	5.0" ASA Flange	14.1	40.0	47.5	4.0	2.6	4.0	5.7	84
0155-2341-06	4.0" NPT	10.1	47.0	52.1	4.0	0	3.0	4.0	52
0155-2341-07	3.0" NPT	10.1	36.0	41.1	3.0	1.8	3.0	4.0	39
0155-2341-08	2.5" NPT	9.0	36.0	40.8	3.0	1.5	2.5	3.4	33
0155-2341-09	2.0" NPT	8.1	30.0	33.4	2.5	0	2.0	2.8	22
0155-2341-10*	14.0" ASA Flange	36.1	84.1	97.9	10.0	0	4.0	8.5	792

Critical – Attenuation Levels 25-35 dBa

Part Number	Dimensions								Weight (lbs)
	A	B	C	D	E	F	G	H	
0155-2342-01*	6.0" ASA Flange	16.1	69.0	76.4	5.0	3.1	4.0	5.9	180
0155-2342-02*	8.0" ASA Flange	22.1	72.1	82.3	8.0	0	4.0	6.9	255
0155-2342-03*	10.0" ASA Flange	26.1	72.1	83.4	9.0	0	4.0	7.4	387
0155-2342-04*	12.0" ASA Flange	30.1	96.0	108.4	10.0	0	4.0	8.0	610
0155-2342-05	5.0" ASA Flange	14.1	60.0	67.5	4.0	2.6	4.0	5.7	112
0155-2342-06*	4.0" NPT	12.1	55.0	61.2	4.0	1.8	3.0	4.5	82
0155-2342-07	3.0" NPT	11.1	47.0	52.8	3.0	0	3.0	4.3	58
0155-2342-08	2.5" NPT	10.1	45.0	49.3	3.0	0	2.5	3.5	50
0155-2342-09	2.0" NPT	9.0	38.0	42.4	2.5	0	2.0	3.0	34
0155-2342-10*	14.0" ASA Flange	42.3	96.0	111.6	10.0	0	4.0	9.5	1290

* Parts are special use or sale order; manual allocation

**Part is not orderable from Fridley or a PDC. Part number needs to be ordered from SR Sales.

PowerCommand® Annunciator

Discrete Input or PCCNet



> Specification sheet

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**Power
Generation**

Description

The Universal Annunciator Module provides visual and audible indication of up to 20 separate alarm or status conditions, based on discrete (relay) inputs or network inputs. Each LED can be controlled by either a discrete wire input or by a signal on the PCCNet network sent from an external device, such as a PCC1301 or PCC2100 (version 2.4 or later) control.

In addition to the LEDs, the annunciator can control four custom relays based on signals received over the PCCNet. When one of the annunciator's discrete inputs is activated, the annunciator will broadcast that information over the network. By taking advantage of the network, discrete inputs and custom relays, the annunciator can be used as expanded I/O for a genset controller.

Easily installed in a location to give immediate notification of an alarm or warning status. Designed to give operating/monitoring personnel quick-glance status information. The module directly senses battery voltage to provide green/yellow/red alarm and status information for that parameter.

Genset controller complies with NFPA level two requirements when used with the display but without the annunciator panel. When used with the annunciator it meets NFPA level one requirements (emergency and standby power systems). The annunciator module can also be used for monitoring of transfer switch or other equipment status.

Features

- Visual and audible warnings of up to 20 separate alarm or status conditions.
- LEDs can be controlled either via PCCNet or discrete input.
- Status of discrete inputs is broadcast on network.
- Four custom relays can be controlled over the PCCNet network.
- Configurable LED color (red, yellow or green) and selectable horn operation allows maximum flexibility.
- Standard NFPA 110 label, field configurable for other alarm status and conditions.
- Each audible alarm is annunciated, regardless of the number of existing alarm conditions displayed.
- Sealed membrane panel design provides environmental protection for internal components and is easy to clean.
- Configurable for negative (ground) input or positive input.
- Integral DC voltage sensing.
- Flush or surface mount provisions.
- UL Listed and labeled; CSA certified; CE marked.

Specifications

Signal requirements

Positive - Input impedance is 1.82 kOhms to ground; maximum input voltage = 31 VDC.

Negative - Input impedance is 1.82 kOhms to Bat+; inputs are at Bat+ level when open.

Sink/source current threshold for detection - 150 uA minimum, 3 mA maximum.

Typical conductor size: 16 ga for 304.8 m (1000 ft)

Max conductor size for terminal: 12 ga

Relay outputs

0.2 A at 125 VAC and 1 A at 30 VDC

Network connections

Use Belden 9729 two pair, stranded, shielded 24 AWG twisted pair cable for all PCCNet connections. Total network length can not exceed 1219 m (4000 ft). Up to 20 nodes can be connected to the network.

Note: Any communications wire connected to the generator set should be stranded cable.

Power

Maximum consumption: 15 watts

Battery voltage

Functional range - Audible and visual conditions operational from 6.5 to 31 VDC.

Low voltage setting - 12.0 VDC for 12 Volt nominal systems; 24.0 for 24 Volt nominal systems.

High voltage setting - 16.0 Volt for 12 Volt nominal systems; 32.0 Volt for 24 Volt nominal systems.

Alarm horn

Sound level: 90 dB at 30 cm

Physical

Weight (with enclosure): 1.4 kg (3.0 lbs)

Temperature

-20 °C to +70 °C (-4 °F to +158 °F)

Humidity

10% to 95% RH (non-condensing)

Default lamp configurations

Can be configured for current NFPA 110 standard or as a replacement for Legacy (pre-2001) NFPA 110 annunciator (300-4510 or 300 4511)

Lamp	Description	NFPA 110		
		Color	Horn	Flash
DS1	Customer fault 1	Green	No	No
DS2	Customer fault 2	Amber	No	No
DS3	Customer fault 3	Red	No	No
DS4	Genset supplying load	Amber	No	No
DS5	Charger AC failure	Amber	Yes	No
DS6	Low coolant level	Amber	Yes	No
DS7	Low fuel level	Red	Yes	No
DS8	Check generator set	Amber	No	No
DS9	Not in auto	Red	Yes	Yes
DS10	Generator set running	Amber	No	No
DS11	High battery voltage	Amber	Yes	No
DS12	Low battery voltage	Red	Yes	No
DS13	Weak battery	Red	Yes	No
DS14	Fail to start	Red	Yes	No
DS15	Low coolant temp	Red	Yes	No
DS16	Pre-high engine temp	Amber	Yes	No
DS17	High engine temp	Red	Yes	No
DS18	Pre-low oil pressure	Red	Yes	No
DS19	Low oil pressure	Red	Yes	No
DS20	Overspeed	Red	Yes	No

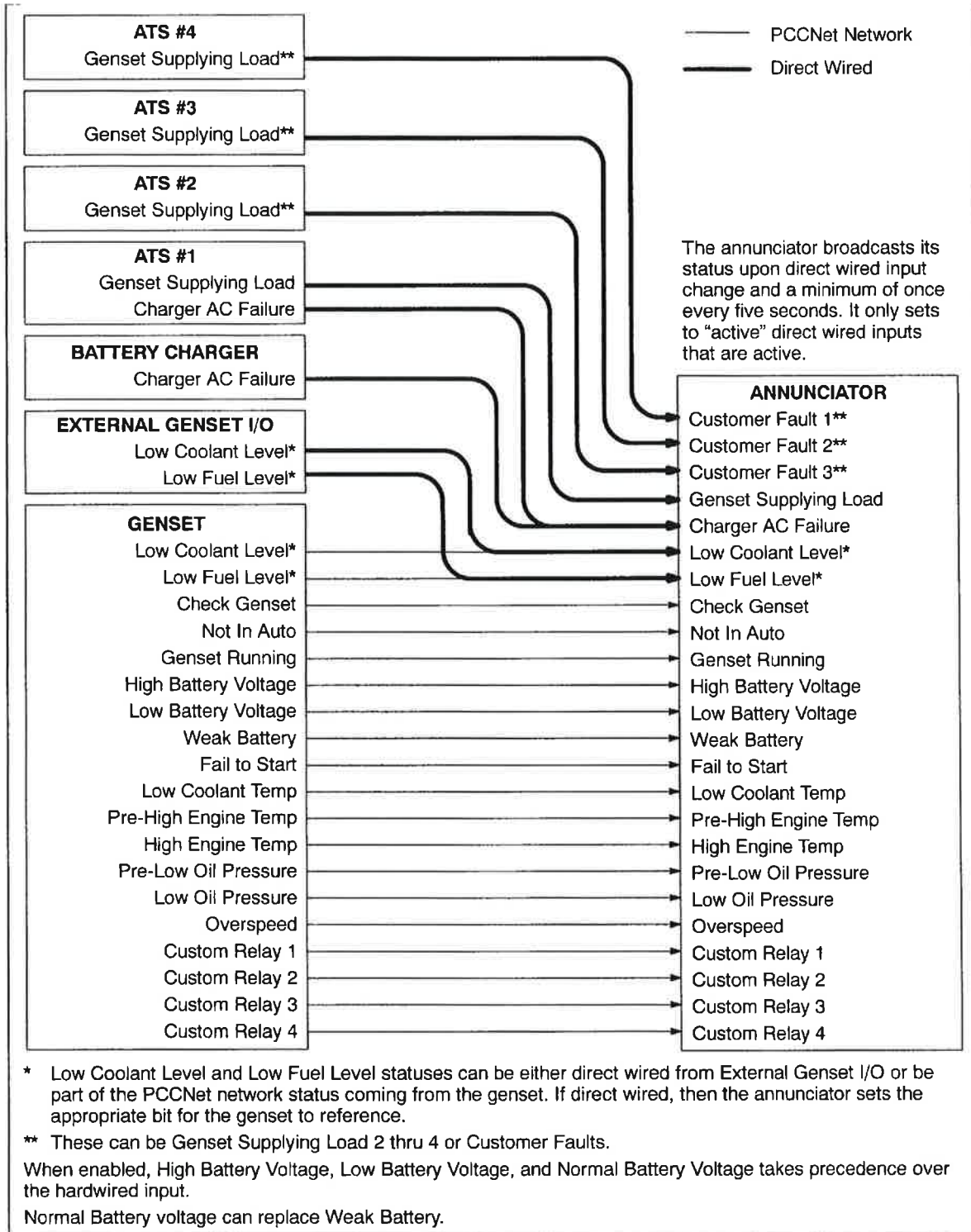
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Typical installation



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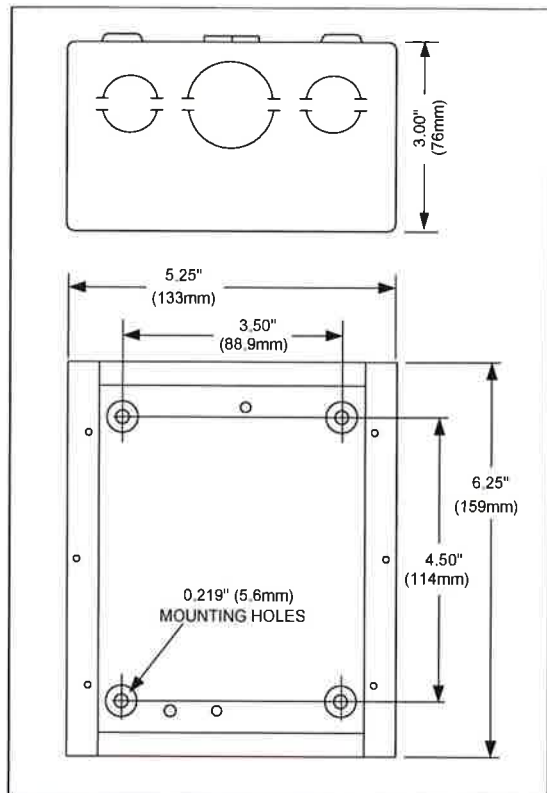
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**Power
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Dimensions



Dimensions: in (mm)

Ordering information

Part number	Description
0300-5929-01	Panel mount
0300-5929-02	Panel with enclosure

PCCNet
COMPATIBLE

See your distributor for more information.

Cummins Power Generation

Americas

1400 73rd Avenue N.E.
Minneapolis, MN 55432 USA
Phone: 763 574 5000
Fax: 763 574 5298

Europe, CIS, Middle East and Africa

Manston Park Columbus Ave.
Manston Ramsgate
Kent CT 12 5BF United Kingdom
Phone 44 1843 255000
Fax 44 1843 255902

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10 Toh Guan Road #07-01
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S 1472a (8/09)





Exhaust emission data sheet

750DQCB

60 Hz Diesel generator set
EPA NSPS stationary emergency

Engine information:

Model:	Cummins Inc QSK23-G7 NR2	Bore:	6.69 in. (170 mm)
Type:	4 Cycle, in line, 6 cylinder diesel	Stroke:	6.69 in. (170 mm)
Aspiration:	Turbocharged and CAC	Displacement:	1413 cu. in. (23.1 liters)
Compression ratio:	16.0:1		
Emission control device:	Turbocharged with charge air-cooled		

	<u>1/4</u>	<u>1/2</u>	<u>3/4</u>	<u>Full</u>	<u>Full</u>
<u>Performance data</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Prime</u>
Engine HP @ stated load (1800 RPM)	275	550	825	1100	989
Fuel consumption (gal/Hr)	15.2	27.6	39.5	50.5	46.5
Exhaust gas flow (CFM)	2270.8	3464.5	4460.2	5160.8	4864
Exhaust gas temperature (°F)	623.6	726.9	786.2	840	815
<u>Exhaust emission data</u>					
HC (Total unburned hydrocarbons)	0.77	0.33	0.19	0.12	0.15
NOx (Oxides of nitrogen as NO ₂)	2.91	3.31	4.15	5.87	5.27
CO (Carbon monoxide)	0.95	0.37	0.19	0.28	0.25
PM (Particular matter)	0.27	0.1	0.05	0.05	0.05
SO ₂ (Sulfur dioxide)	0.12	0.11	0.1	0.1	0.1
Smoke (Bosch)	0.84	0.5	0.35	0.38	0.36

All values are Grams per HP-Hour

Test conditions

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load ($\pm 2\%$). Pressures, temperatures, and emission rates were stabilized.

Fuel specification:	46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Fuel temperature:	99 \pm 9 °F (at fuel pump inlet)
Intake air temperature:	77 \pm 9 °F
Barometric pressure:	29.6 \pm 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H ₂ O/lb dry air
Reference standard:	ISO 8178

The NO_x, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



Cooling System Data

DQCB

EPA NSPS Stationary Emergency: Tier 2

High Ambient Air Temperature Radiator Cooling System										
	Duty	Rating (kW)	Max Cooling @ Air Flow Static Restriction, Unhoused inches water (mm water)					Housed in Free Air, No Air Discharge Restriction		
			0.0 (0.0)	0.25 (6.4)	0.5 (12.7)	0.75 (19.1)	1.0 (25.4)	Weather	Sound Level1	Sound Level2
			Maximum Allowable Ambient Temperature, Degree C							
60	Standby	750	65.3	62.8	60.7	56.4	53.2	56.7	56.0	54.7
Hz	Prime	800	63.6	61.3	57.9	53.3	50.2	53.5	54.7	53.7

Notes:

1. Data shown are anticipated cooling performance for typical generator set.
2. Cooling data is based on 1000 ft (305 m) site test location.
3. Generator set power output may need to be reduced at high ambient conditions. Consult generator set data sheet for de-rate schedules.
4. Cooling performance may be reduced due to several factors including but not limited to: Incorrect installation, improper operation, fouling of the cooling system, and other site installation variables.



Sound data

750DQCB 60 Hz

"Sound data - with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD)"

Sound pressure level @ 7 meters, dB(A)

See notes 1-8 listed below

Configuration		Measurement location number								Average
		1	2	3	4	5	6	7	8	
Standard - unboxed	Infinite exhaust	90	95	95	96	93	96	94	95	95
F200 - weather	Mounted muffler	85	81	79	90	91	91	78	81	87
F201 - quiet site II first stage	Mounted muffler	85	80	73	74	78	74	74	80	79
F202 - quiet site II second stage	Mounted muffler	73	71	74	74	75	76	75	72	74

Sound power level, dB(A)

See notes 2-6, 9, 10 listed below

Configuration		Octave band center frequency (Hz)								Overall sound power level
		63	125	250	500	1000	2000	4000	8000	
Standard - unboxed	Infinite exhaust	83	102	107	113	115	115	113	108	121
F200 - weather	Mounted muffler	93	102	107	109	108	107	104	99	115
F201 - quiet site II first stage	Mounted muffler	92	100	101	102	101	101	100	95	109
F202 - quiet site II second stage	Mounted muffler	86	96	96	93	100	99	99	91	106

Exhaust sound power level, dB(A)

Open exhaust (No muffler rated load)	Octave band center frequency (Hz)								Sound power level
	63	125	250	500	1000	2000	4000	8000	
	105	112	120	121	125	126	126	124	132

Note:

- Position 1 faces the engine front. The positions proceed around the generator set in a counter-clockwise direction in 45° increments. All positions are at 7 m (23 ft) from the surface of the generator set and 1.2 m (48") from floor level.
- Sound levels are subject to instrumentation, measurement, installation and manufacturing variability.
- Sound data with remote-cooled generator sets are based on rated loads without cooling fan noise.
- Sound levels for aluminum enclosures are approximately 2 dB(A)s higher than listed sound levels for steel enclosures.
- Sound data for generator set with infinite exhaust do not include exhaust noise.
- Data is based on full rated load with standard radiator-cooling fan package
- Sound pressure levels are measured per ANSI S1.13 and ANSI S12.18, as applicable.
- Reference sound pressure is 20 µPa.
- Sound power levels per ISO 3744 and ISO 8528-10, as applicable.
- Reference power = 1 pw (10⁻¹² W)
- Exhaust sound pressure levels are per ISO 6798, as applicable.



Prototype Test Support (PTS) 60 Hz test summary



Generator set models

600DQCA

800DQCC

750DQCB

Representative prototype

Model: 800DQCC

Alternator: HC6H

Engine: QSK23-G7 NR2

Rated

voltage: 480 V

The following summarizes prototype testing conducted on the designated representative prototype of the specified models. This testing is conducted to verify the complete generator set electrical and mechanical design integrity.

Prototype testing is conducted only on generator sets not sold as new equipment.

Maximum surge power: 833 kW

The generator set was evaluated to determine the stated maximum surge power.

Torsional analysis and testing:

The generator set was tested to verify that the design is not subjected to harmful torsional stresses. A spectrum analysis of the transducer output was conducted over the speed range of 1350 to 1950 RPM.

Cooling system: 50 °C ambient
0.50 in H₂O restriction

The cooling system was tested to determine ambient temperature and static restriction capabilities. The test was performed at full rated load in elevated ambient temperature under stated static restriction conditions.

Durability:

The generator set was subjected to a minimum 500 hour endurance test operating at variable load up to the standby rating based upon MIL-STD-705 to verify structural soundness and durability of the design.

Electrical and mechanical strength:

The generator set was tested to several single phase and three phase faults to verify that the generator can safely withstand the forces associated with short circuit conditions. The generator set was capable of producing full rated output at the conclusion of the testing.

Steady state performance:

The generator set was tested to verify steady state operating performance was within the specified maximum limits.

Voltage regulation: ± 0.50%
Random voltage variation: ± 0.50%
Frequency regulation: Isochronous
Random frequency variation: ± 0.25%

Transient performance:

The generator set was tested with the standard alternator to verify single step loading capability as required by NFPA 110. Voltage and frequency response on load: addition and rejection were evaluated. The following results were recorded at 0.8 PF:

Full load acceptance:

Voltage dip: 30.0%
Recovery time: 2.3 seconds
Frequency dip: 9.3%
Recovery time: 3.9 seconds

Full load rejection:

Voltage rise: 23.7%
Recovery time: 2.6 seconds
Frequency rise: 4.6%
Recovery time: 3.4 seconds

Harmonic analysis: Distortion percentage per MIL
(per MIL-STD-705B, Method 601.4)

<u>Harmonic</u>	<u>Line to Line</u>		<u>Line to Neutral</u>	
	<u>No load</u>	<u>Full load</u>	<u>No load</u>	<u>Full load</u>
3	0.036	0.245	0.093	0.169
5	0.083	2.081	0.112	2.171
7	0.824	0.609	0.820	0.597
9	0.023	0.042	0.021	0.074
11	0.600	0.355	0.613	0.397
13	0.307	0.300	0.295	0.308
15	0.009	0.017	0.009	0.094

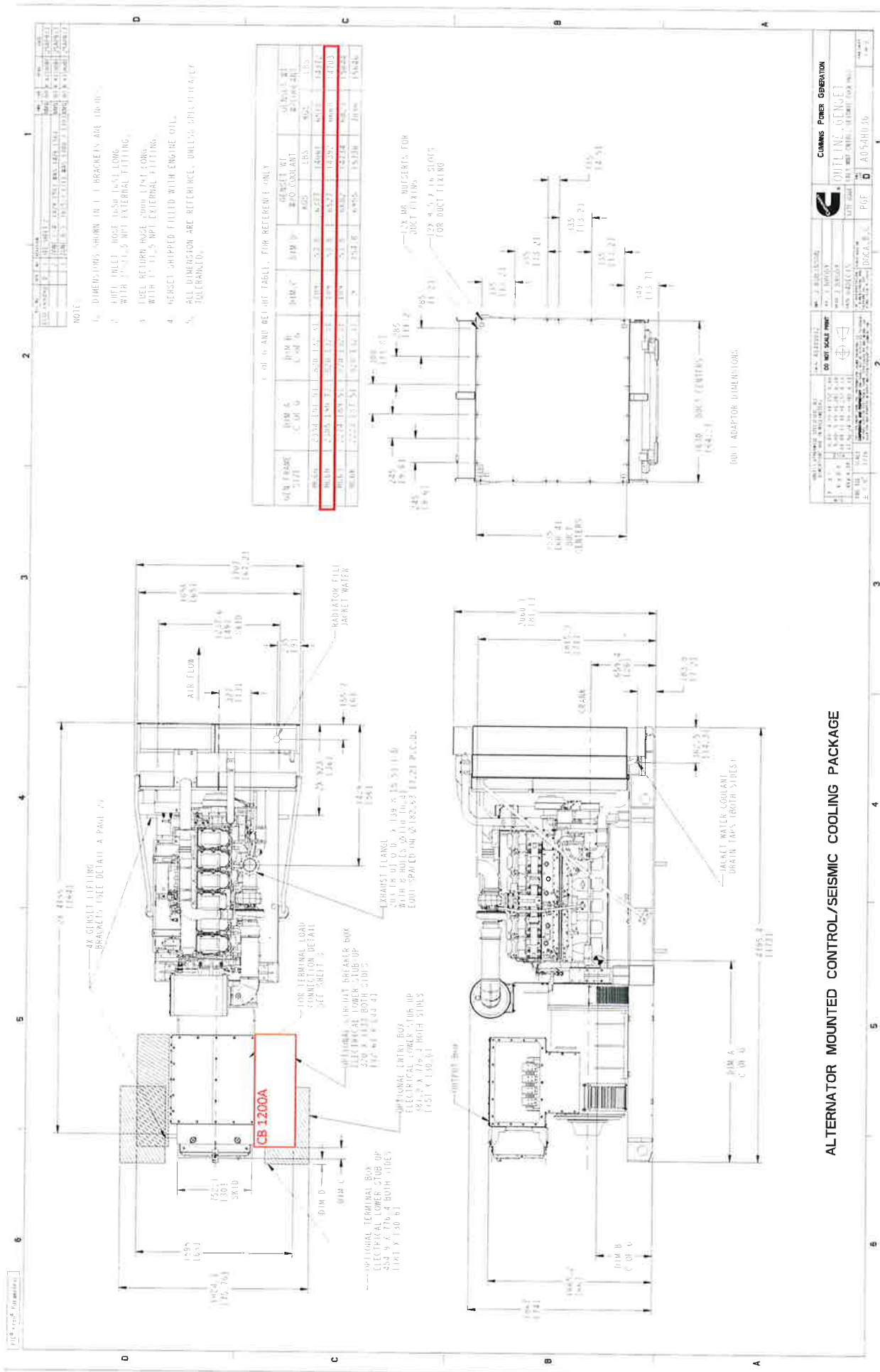


Alternator data sheet

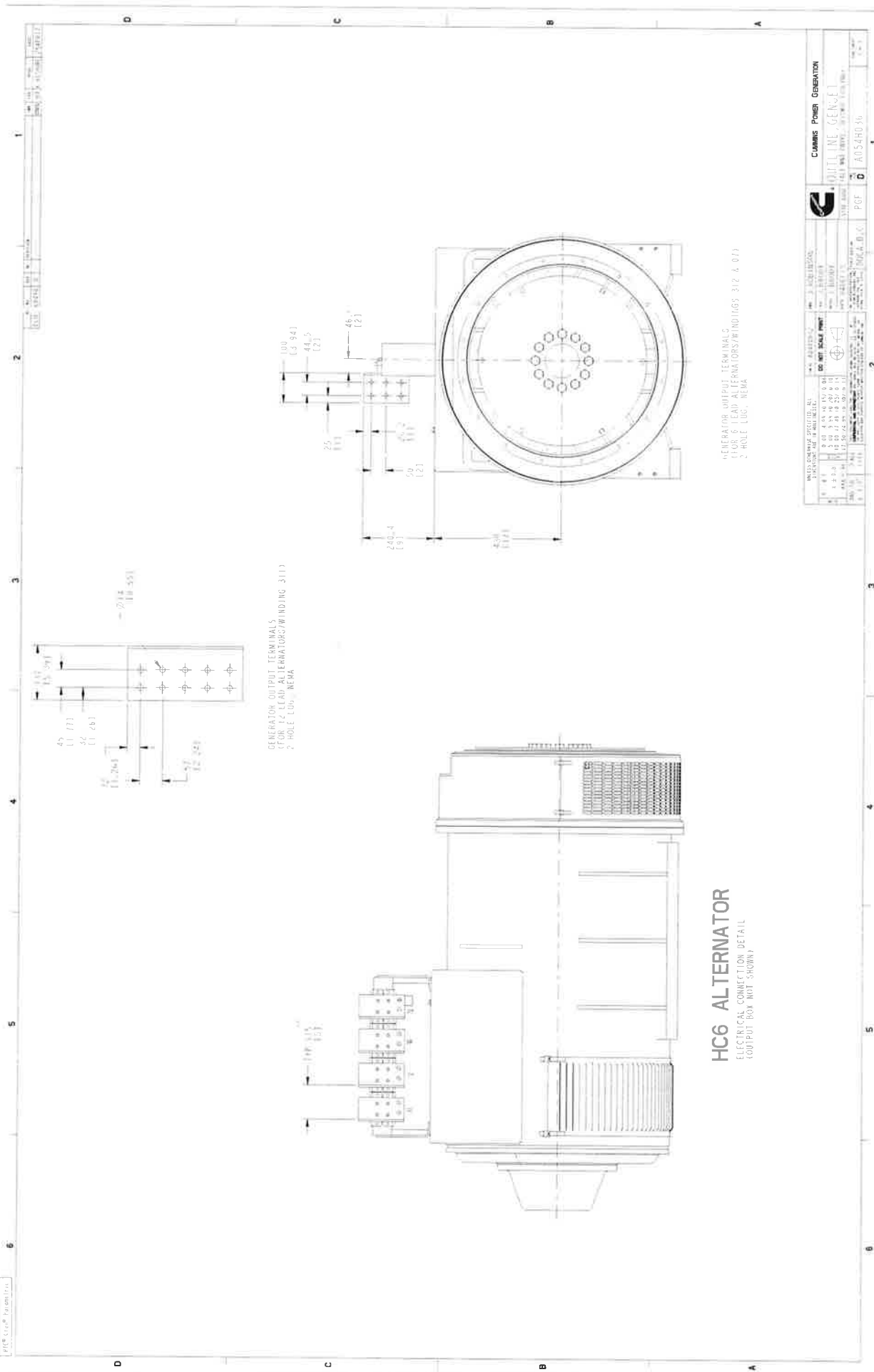
Frame size: HC6H

Characteristics									
Weights:		Wound stator assembly:		2109 lb		950 kg			
		Rotor assembly:		1911 lb		861 kg			
		Complete alternator:		4451 lb		2005 kg			
Maximum speed:				2250 rpm					
Excitation current:		Full load:		2.5 Amps					
		No load:		0.5 Amps					
Insulation system:		Class H throughout							
3 ∅ Ratings (0.8 power factor)			60 Hz				50 Hz		
(Based on specific temperature rise at 40° C ambient temperature)			110/190* 220/380	120/208* 240/416	139/240* 277/480	347/600	110/190* 220/380	120/208* 240/415	127/220* 254/440
150° C rise ratings	kW	795	870	950	900	768	768	736	
	kVA	994	1088	1188	1125	960	960	920	
125° C rise ratings	kW	750	820	900	850	728	728	700	
	kVA	938	1025	1125	1063	910	910	875	
105° C rise ratings	kW	690	730	820	770	664	664	640	
	kVA	863	913	1025	963	830	830	800	
80° C rise ratings	kW	575	632	720	680	592	592	590	
	kVA	719	790	900	850	740	740	738	
Reactances (per unit ± 10%)			110/190* 220/380	120/208* 240/416	139/240* 277/480	347/600	110/190* 220/380	120/208* 240/415	127/220* 254/440
(Based on full load at 125° C rise rating)									
Synchronous			3.66	3.34	2.75	2.60	2.98	2.50	2.14
Transient			0.29	0.27	0.22	0.21	0.28	0.23	0.20
Subtransient			0.21	0.19	0.16	0.15	0.20	0.16	0.14
Negative sequence			0.25	0.23	0.19	0.18	0.21	0.18	0.15
Zero sequence			0.03	0.03	0.02	0.02	0.03	0.02	0.02
Motor starting			Broad range			600	Broad range		
Maximum kVA (90% sustained voltage)			3313			3313	2250		
Time constants (sec)			Broad range			600	Broad range		
Transient			0.185			0.185	0.185		
Subtransient			0.025			0.025	0.025		
Open circuit			2.440			2.440	2.440		
DC			0.040			0.040	0.040		
Windings (@ 20° C)			Broad range			600	Broad range		
Stator resistance (Ohms per phase)			0.0060			0.0072	0.0060		
Rotor resistance (Ohms)			1.4700			1.4700	1.4700		
Number of leads			6 (12 optional)			6	6 (12 optional)		

* 12 lead reconnectable option is required to obtain low (parallel wye) voltages.



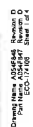
1. 姓名 (NAME) 2. 性别 (SEX) 3. 年龄 (AGE) 4. 职业 (OCC) 5. 住址 (ADDRESS) 6. 电话 (PHONE) 7. 邮编 (ZIP) 8. 电子邮箱 (E-MAIL) 9. 其他 (OTHER)	10. 出生日期 (DATE OF BIRTH) 11. 婚姻状况 (MARRIAGE STATUS) 12. 教育程度 (EDUCATION) 13. 工作经历 (WORK EXPERIENCE) 14. 兴趣爱好 (HOBBIES) 15. 自我评价 (SELF-APPRAISAL)	16. 照片 (PHOTO) 17. 指纹 (FINGERPRINT) 18. 签名 (SIGNATURE) 19. 日期 (DATE) 20. 地点 (PLACE)	21. 备注 (REMARKS) 22. 其他 (OTHER)
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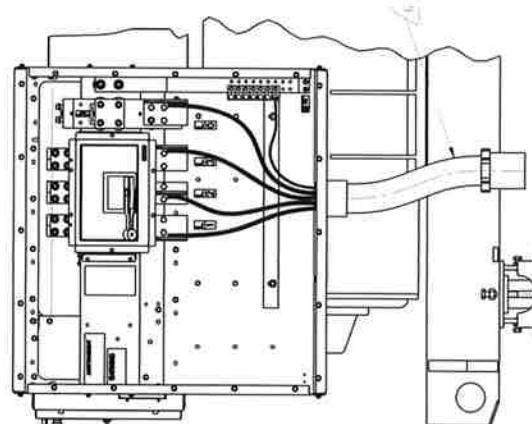
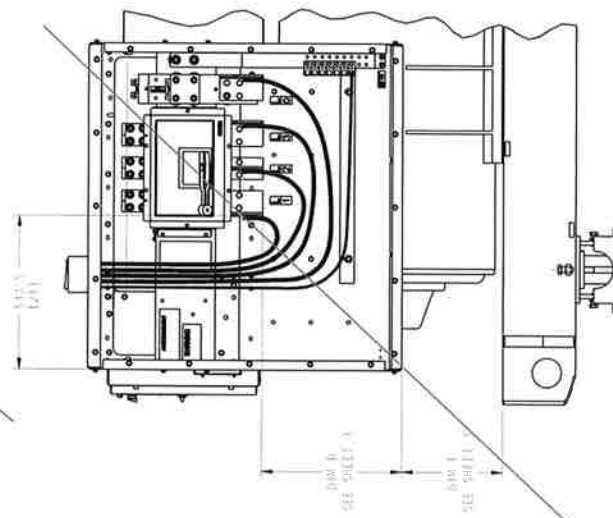
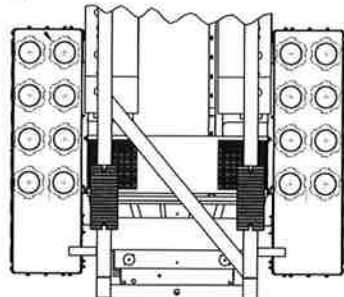
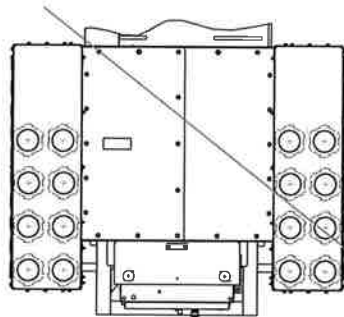


HC6 ALTERNATOR ELECTRICAL CONNECTION DETAIL (OUTPUT BOX NOT SHOWN)

GENERATOR UNIT TERMINAL C
(FOR 6 LEAD ALTERNATORS/WINDINGS 312 & Q1)

WELLS OILFIELD SERVICES, INC.		DO NOT SCALE FROM THIS DRAWING		CUMMINS POWER GENERATION	
REV	DATE	BY	CHKD	REV	DATE
1	01/10/11	1	1	1	01/10/11
2	01/10/11	2	2	2	01/10/11
3	01/10/11	3	3	3	01/10/11
4	01/10/11	4	4	4	01/10/11
5	01/10/11	5	5	5	01/10/11
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96	01/10/11	96	96	96	01/10/11
97	01/10/11	97	97	97	01/10/11
98	01/10/11	98	98	98	01/10/11
99	01/10/11	99	99	99	01/10/11
100	01/10/11	100	100	100	01/10/11



[illegible]

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TABLE 1

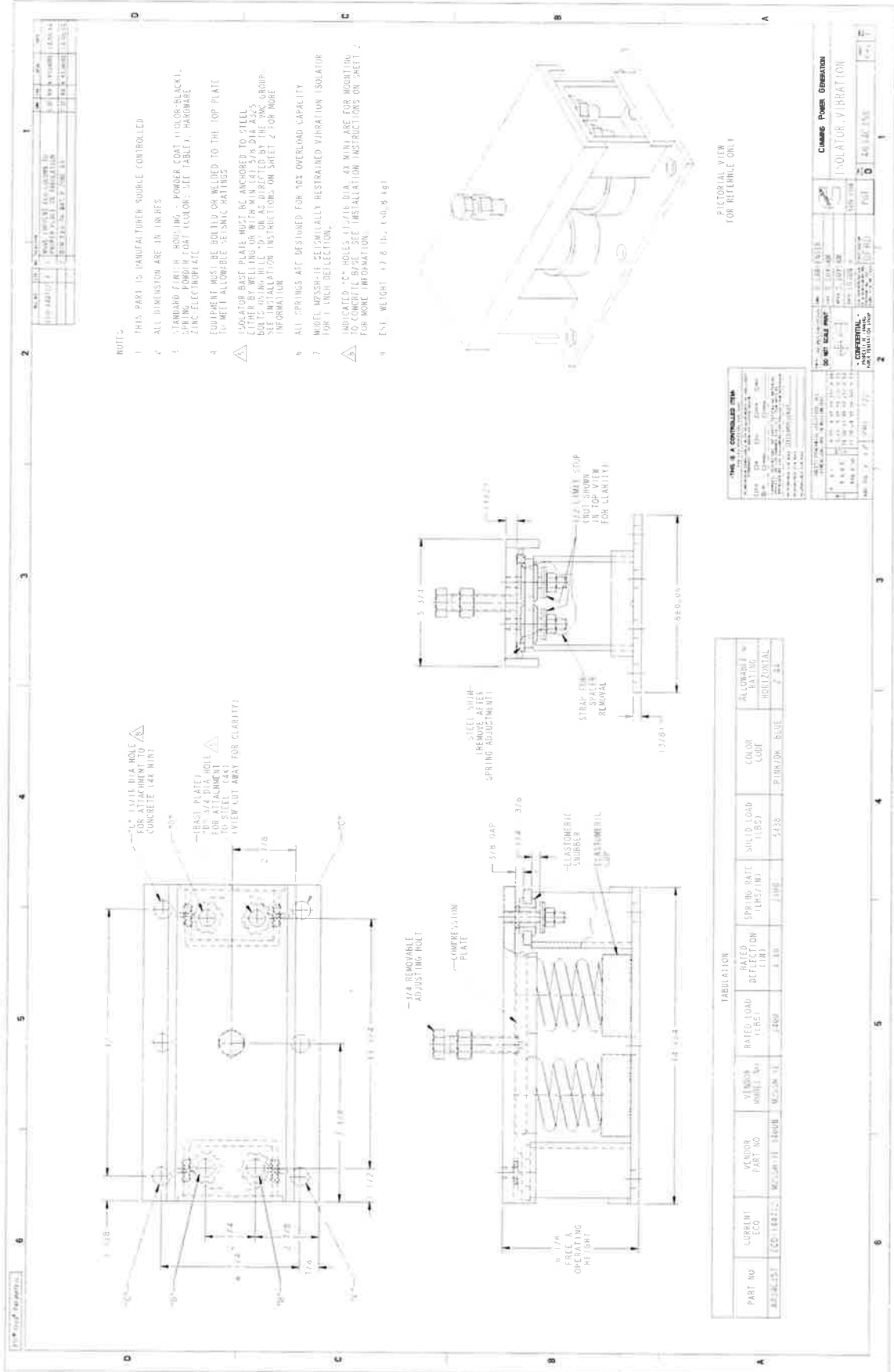
TABLE 2

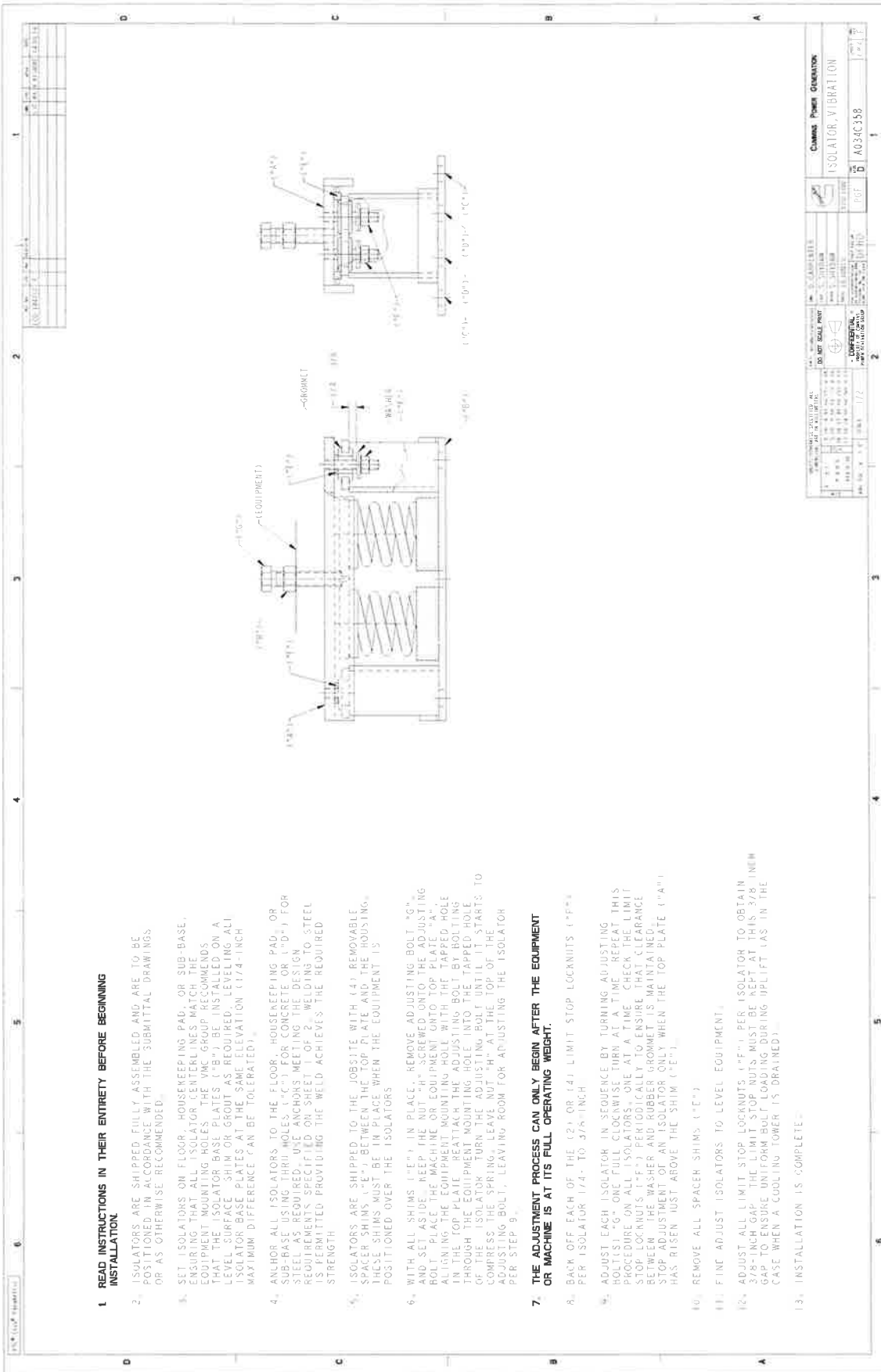
Typical conduct and wire size based on NEC 2014, Article 310.15, Tables 310.15 (B)(1) and 310.15 (B)(2)(1) for 90°C temperature rated conductors at 30°C ambient, and Annex C with 4 current-carrying conductors, in each conduit.

WATER DRAIN DRAIN	WIRE (COPPER)	CABLE CAPACITY	TOTAL NUMBER OF CONDUCTORS
1000	500	100	100
2000	1000	200	200
3000	1500	300	300
4000	2000	400	400
5000	2500	500	500
6000	3000	600	600
7000	3500	700	700
8000	4000	800	800
9000	4500	900	900
10000	5000	1000	1000

TABLE 3

GENSET 200C1	AN TEMPERATURE MODEL	RMSE, °K
<input type="checkbox"/> HCG A	<input type="checkbox"/> HCG 540	119.3 [2.54]
<input type="checkbox"/> HCG B	<input type="checkbox"/> HCG 54H	115.7 [2.54]
<input type="checkbox"/> HCG C	<input type="checkbox"/> HCG 54 J	115.3 [2.54]
<input type="checkbox"/> HCG D	<input type="checkbox"/> HCG 74K	124.1 [2.54]





1. READ INSTRUCTIONS IN THEIR ENTIRETY BEFORE BEGINNING INSTALLATION.

2. ISOLATORS ARE SHIPPED FULLY ASSEMBLED AND ARE TO BE POSITIONED IN ACCORDANCE WITH THE SUBMITTAL DRAWINGS OR AS OTHERWISE RECOMMENDED.
3. SET ISOLATORS ON FLOOR, HOUSEKEEPING PAD, OR SUB-BASE, ENSURING THAT ALL ISOLATOR CENTERLINES MATCH THE EQUIPMENT MOUNTING HOLES. THE VMC GROUP RECOMMENDS THAT THE ISOLATOR BASE PLATES ("B") BE INSTALLED ON A LEVEL SURFACE. SHIM OR GROUT AS REQUIRED. LEVELING ALL ISOLATOR BASE PLATES AT THE SAME ELEVATION (1/4-INCH MAXIMUM DIFFERENCE CAN BE TOLERATED).
4. ANCHOR ALL ISOLATORS TO THE FLOOR, HOUSEKEEPING PAD, OR SUB-BASE USING EPOXY ANCHORS. EPOXY ANCHORS MUST MEET ALL STEEL AS REQUIRED. THE ANCHORS MEETING THE DESIGN REQUIREMENTS SPECIFIED ON SHEET 1 OF 2. WELDING TO STEEL IS PERMITTED PROVIDING THE WELD ACHIEVES THE REQUIRED STRENGTH.
5. ISOLATORS ARE SHIPPED TO THE JOBSITE WITH (4) REMOVABLE SPACER SHIMS ("E") BETWEEN THE TOP PLATE AND THE HOUSING. THESE SHIMS MUST BE IN PLACE WHEN THE EQUIPMENT IS POSITIONED OVER THE ISOLATORS.
6. WITH ALL SHIMS ("E") IN PLACE, REMOVE ADJUSTING BOLT ("G") AND SET ASIDE. KEEP THE NUT ("H") SCREWED ONTO THE ADJUSTING BOLT PLATE. THE MACHINE OR EQUIPMENT ONTO TOP PLATE "A" ALIGNING THE EQUIPMENT MOUNTING HOLE WITH THE TAPPED HOLE IN THE TOP PLATE. REATTACH THE ADJUSTING BOLT BY BOLTING THROUGH THE EQUIPMENT MOUNTING HOLE INTO THE TAPPED HOLE OF THE ISOLATOR. TURN THE ADJUSTING BOLT UNTIL IT STARTS TO COMPRESS THE SPRING. LEAVE NUT "H" AT THE TOP OF THE ADJUSTING BOLT, LEAVING ROOM FOR ADJUSTING THE ISOLATOR PER STEP 9.
7. **THE ADJUSTMENT PROCESS CAN ONLY BEGIN AFTER THE EQUIPMENT OR MACHINE IS AT ITS FULL OPERATING WEIGHT.**
8. BACK OFF EACH OF THE (2) OR (4) LIMIT STOP LOCKNUTS ("F") PER ISOLATOR 1/4" TO 3/8-INCH.
9. ADJUST EACH ISOLATOR IN SEQUENCE BY TURNING ADJUSTING BOLT(S) "G" ONE FULL CLOCKWISE TURN AT A TIME. REPEAT THIS PROCEDURE ON ALL ISOLATORS. ONE AT A TIME. CHECK THE LIMIT STOP LOCKNUTS ("F") PERIODICALLY TO ENSURE THAT CLEARANCE BETWEEN THE WASHER AND RUBBER GROMMET IS MAINTAINED. STOP ADJUSTMENT OF AN ISOLATOR ONLY WHEN THE TOP PLATE ("A") HAS RISEN JUST ABOVE THE SHIM ("E").
10. REMOVE ALL SPACER SHIMS ("E").
11. FINE ADJUST ISOLATORS TO LEVEL EQUIPMENT.
12. ADJUST ALL LIMIT STOP LOCKNUTS ("F") PER ISOLATOR TO OBTAIN 3/8-INCH GAP. THE LIMIT STOP NUTS MUST BE KEPT AT THIS 3/8 INCH GAP TO ENSURE UNIFORM BOLT LOADING DURING UPLIFT (AS IN THE CASE WHEN A COOLING TOWER IS DRAINED).
13. INSTALLATION IS COMPLETE.

Our energy working for you.™



Limited Standby 5 Year or 1,500 Hour Parts + Labor + Travel Extended Warranty – L189

Commercial Generating Set

When purchased, this limited extended warranty applies to all Cummins Power Generation® branded commercial generating sets and associated accessories (hereinafter referred to as "Product").

This warranty covers any failures of the Product, under normal use and service, which result from a defect in material or factory workmanship.

Warranty Period:

The warranty start date is the date of initial start up, first rental, demonstration or 18 months after factory ship date, whichever is sooner. The coverage duration is 5 years from warranty start date or 1,500 hours, whichever occurs first.

Emergency Standby Power (ESP) is defined as the maximum power available during a-variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage. The permissible average power output over 24 hours of operation shall not exceed 70% of the ESP.

Cummins Power Generation® Responsibilities:

In the event of a failure of the Product during the extended warranty period due to defects in material or workmanship, Cummins Power Generation® will only be responsible for the following costs:

- All parts and labor required to repair the Product.
- Reasonable travel expenses to and from the Product site location.
- Maintenance items that are contaminated or damaged by a warrantable failure.

Owner Responsibilities:

The owner will be responsible for the following:

- Notifying Cummins Power Generation® distributor or dealer within 30 days of the discovery of failure.
- Installing, operating, commissioning and maintaining the Product in accordance with Cummins Power Generation®'s published policies and guidelines.
- Providing evidence for date of commissioning.
- Providing sufficient access to and reasonable ability to remove the Product from the installation in the event of a warrantable failure.

In addition, the owner will be responsible for:

- Incremental costs and expenses associated with Product removal and reinstallation resulting from non-standard installations.
- Costs associated with rental of generating sets used to replace the Product being repaired.
- Costs associated with labor overtime and premium shipping requested by the owner.
- All downtime expenses, fines, all applicable taxes, and other losses resulting from a warrantable failure.

Limitations:

This limited extended warranty does not cover Product failures resulting from:

- Inappropriate use relative to designated power rating.
- Inappropriate use relative to application guidelines.
- Failures due to normal wear, corrosion, varnished fuel system parts, lack of reasonable and necessary maintenance, unauthorized modifications and/or repair, and use of add-on or modified parts.
- Improper and/or unauthorized installation.
- Owner's or operator's negligence, accidents or misuse.
- Noncompliance with any Cummins Power Generation® published guideline or policy.
- Use of improper or contaminated fuels, coolants or lubricants.
- Improper storage before and after commissioning.

Limitations Continued:

- Owner's delay in making Product available after notification of potential Product problem.
- Replacement parts and accessories not authorized by Cummins Power Generation®.
- Use of Battle Short Mode
- Owner or operator abuse or neglect such as: operation without adequate coolant or lubricants; overfueling; overspeeding; lack of maintenance to lubricating, cooling or air intake systems; late servicing and maintenance; improper storage, starting, warm-up, run-in or shutdown practices, or for progressive damage resulting from a defective shutdown or warning device.
- Damage to parts, fixtures, housings, attachments and accessory items that are not part of the generating set.

This limited extended warranty does not cover costs resulting from:

- Difficulty in gaining access to the Product.
- Damage to customer property.
- Repair of cosmetic damage to enclosures.

Items not covered by this limited extended warranty:

- Batteries
- Enclosures
- Coolant heaters
- Exhaust systems and aftertreatment components
- Maintenance items

www.cumminspower.com

CUMMINS POWER GENERATION® RIGHT TO FAILED COMPONENTS:

Failed components claimed under warranty remain the property of Cummins Power Generation®. Cummins Power Generation® has the right to reclaim any failed component that has been replaced under warranty.

THE WARRANTIES SET FORTH HEREIN ARE THE SOLE WARRANTIES MADE BY CUMMINS POWER GENERATION ® IN REGARD TO THE PRODUCT. CUMMINS POWER GENERATION® MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT IS CUMMINS POWER GENERATION® LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

This limited extended warranty shall be enforced to the maximum extent permitted by applicable law. This limited extended warranty gives the owner specific rights that may vary from state to state or from jurisdiction to jurisdiction.

Product Model Number: _____

Product Serial Number: _____

Date in Service: _____

APPENDIX C – POTENTIAL EMISSIONS CALCULATIONS

ETC #2 Emergency Generator

1220 bhp
 23.1 liters displacement
 181 gal/hr
 5358 cfm
 888 F exhaust temp
 500 hr/yr

Pollutant	g/bhp-hr	lb/hr	tpy	Vendor Emission Factors
VOC (as HC)	0.12	0.32	0.08	
NO _x	5.87	15.79	3.95	
CO	0.28	0.75	0.19	
PM	0.05	0.13	0.03	
SO ₂	0.1	0.27	0.07	
Pollutant	lb/hp-hr	lb/hr	tpy	AP-42 Table 3.4-1, October 1996
CO ₂	1.16	1415.2	354	

Pollutant	lb/MMBtu	lb/hr	tpy	AP-42 Table 3.4-3, October 1996
Benzene	7.76E-04	2.41E-03	6.03E-04	
Toluene	2.81E-04	8.73E-04	2.18E-04	
Xylenes	1.93E-04	6.00E-04	1.50E-04	
Propylene	2.79E-03	8.67E-03	2.17E-03	
Formaldehyde	7.89E-05	2.45E-04	6.13E-05	
Acetaldehyde	2.52E-05	7.83E-05	1.96E-05	
Acrolein	7.88E-06	2.45E-05	6.12E-06	
PAH				AP-42 Table 3.4-4, October 1996
Naphthalene	1.30E-04	4.04E-04	1.01E-04	
Acenaphthylene	9.23E-06	2.87E-05	7.17E-06	
Acenaphthene	4.68E-06	1.45E-05	3.63E-06	
Fluorene	1.28E-05	3.98E-05	9.94E-06	
Phenanthrene	4.08E-05	1.27E-04	3.17E-05	
Anthracene	1.23E-06	3.82E-06	9.55E-07	
Fluoranthene	4.03E-06	1.25E-05	3.13E-06	
Pyrene	3.71E-06	1.15E-05	2.88E-06	
Benz(a)anthracene	6.22E-07	1.93E-06	4.83E-07	
Chrysene	1.53E-06	4.75E-06	1.19E-06	
Benzo(b)fluoranthene	1.11E-06	3.45E-06	8.62E-07	
Benzo(k)fluoranthene	2.18E-07	6.77E-07	1.69E-07	
Benzo(a)pyrene	2.57E-07	7.98E-07	2.00E-07	
Indeno(1,2,3-cd)pyrene	4.14E-07	1.29E-06	3.22E-07	
Dibenz(a,h)anthracene	3.46E-07	1.07E-06	2.69E-07	
Benzo(g,h,i)perylene	5.56E-07	1.73E-06	4.32E-07	
Total PAH	2.12E-04	6.59E-04	1.65E-04	
Total HAPs	4.36E-03	1.36E-02	3.39E-03	

APPENDIX D – PROOF OF ZONING

Parcel # 0902900034

Property Address: 500 N WAKEFIELD DR
NEWARK, DE 19702-
Subdivision: DELMARVA SERVICES CO
Owner: DELMARVA SERVICES CO
630 MARTIN LUTHER KING JR BLVD
Owner Address: P O BOX 231
WILMINGTON, DE 19899
Municipal Info: Unincorporated

Lot #: A
Location:
Map Grid: 07403362
Block:
Census Tract: 139.04
Street Type: NEIGHBORHOOD
Water: PUBLIC
Microfilm #: 012517

Property Class: COMMERCIAL
Lot Size: 8.51
Lot Depth: 412.60
Lot Frontage: 160
Street Finish:

Related Project Plans

	A/P No.	Project Name	Work Type	Status
Details	19920748	DELMARVA CAPITAL REALTY CO.	MAJOR LAND DEVELOPMENT W/O RZN	RECORDED/RESOLV
Details	20020615	DELMARVA CAPITAL REALTY	PARKING PLAN	RECORDED/RESOLV
Details	20021509	COMCAST DATA CENTER	ZONING VERIFICATION PROCESS	COMPLETE
Details	20120656	PEPCO HOLDINGS INC.	GRADING PLAN	COMPLETE

Permit History (July 1998 - present)

	A/P No.	Permit Type	Status
Details	201605711	SIGN PERMIT	Closed
Details	201302670	PLUMBING PERMIT	Closed
Details	201302668	HVAC PERMIT	Closed
Details	201214197	COMMERCIAL BUILDING PERMIT	Closed
Details	201209903	HVAC PERMIT	Closed
Details	201208686	COMMERCIAL TENANT FITOUT	Closed
Details	1303	SIGN PERMIT	Closed

District & Zoning Info**Districts**

- **COUNCIL 11 - DAVID L TACKETT**
- **FIRE/RESCUE - CHRISTIANA**
- **CHRISTINA SCHOOL DIST-TRES**
- NORTH OF C&D CANAL
- PLANNING 10 - UPPER CHRISTINA
- TRAFFIC ZONE T344 (YR2012)
- SEWER DISTRICT NORTHERN-ASMT
- WETLANDS-LU
- DE REP 26-JOHN J VIOLA
- DE SEN 11-BRYAN TOWNSEND

Zoning

- OR - UDC - OFFICE REGIONAL

Deed History

Grantee(s)	Deed	Multi?	Sale Date	Sale Amount
DELMARVA SERVICES CO	610 116	Y	10/1/1987	\$100.00

Tax/Assessment Info**Assessment**

Land: 674200
Structure: 4908400
Homesite: 0
Total: 5582600
County Taxable: 5582600
School Taxable: 5582600

Tax Bills as of 1/29/2020 3:00:04 AM

Tax Year	County			School		
	Principal Due	Penalty Due	Amt Paid	Principal Due	Penalty Due	Amt Paid
2010A	\$0.00	\$0.00	\$40,275.67	\$0.00	\$0.00	\$100,430.97
2011A	\$0.00	\$0.00	\$40,491.72	\$0.00	\$0.00	\$107,074.27
2012A	\$0.00	\$0.00	\$40,602.25	\$0.00	\$0.00	\$116,341.38
2013A	\$0.00	\$0.00	\$40,455.43	\$0.00	\$0.00	\$119,858.42
2014A	\$0.00	\$0.00	\$40,601.14	\$0.00	\$0.00	\$125,234.47
2015A	\$0.00	\$0.00	\$40,555.92	\$0.00	\$0.00	\$125,329.37
2016A	\$0.00	\$0.00	\$40,398.49	\$0.00	\$0.00	\$141,703.14

2017A	\$0.00	\$0.00	\$40,462.13	\$0.00	\$0.00	\$142,093.92
2018A	\$0.00	\$0.00	\$43,394.37	\$0.00	\$0.00	\$145,873.34
2019A	\$0.00	\$0.00	\$46,079.33	\$0.00	\$0.00	\$148,273.86

Tax Payments as of 1/29/2020 3:00:04 AM

Date Paid	Amt Paid
9/27/2010	\$140,706.64
9/29/2011	\$147,565.99
10/1/2012	\$156,943.63
9/23/2013	\$160,313.85
10/1/2014	\$165,835.61
9/30/2015	\$165,885.29
9/28/2016	\$182,101.63
9/27/2017	\$182,556.05
9/17/2018	\$189,267.71
10/2/2019	\$194,353.19

County Balance Due: \$0.00

School Balance Due: \$0.00

These amounts are valid through the last day of the month. For accounts with delinquent balances, statutory penalty will accrue on the first day of next month.

Sewer History as of 1/29/2020 3:00:05 AM

Tax Year	Principal Due	Penalty Due	Date Paid	Amount Paid
2003S1	\$0.00	\$0.00	3/4/2005	\$151.75
2004S1	\$0.00	\$0.00	3/4/2005	\$145.50
2005S1	\$0.00	\$0.00	3/4/2005	\$145.00
2006S1	\$0.00	\$0.00	5/24/2006	\$211.28
2007S1	\$0.00	\$0.00	7/6/2007	\$223.15
2008S1	\$0.00	\$0.00	2/27/2008	\$201.50
2009S1	\$0.00	\$0.00	4/9/2009	\$213.72
2010S1	\$0.00	\$0.00	4/6/2010	\$214.76
2011S1	\$0.00	\$0.00	2/18/2011	\$217.50
2012S1	\$0.00	\$0.00	2/21/2012	\$224.50
2013S1	\$0.00	\$0.00	5/20/2013	\$239.84
2013S2	\$0.00	\$0.00	8/20/2013	\$4,354.70
2013S3	\$0.00	\$0.00	8/20/2013	\$4,523.38
2013S4	\$0.00	\$0.00	6/9/2014	\$5,066.16
2014CF	\$0.00	\$0.00	2/4/2015	\$113.42
2014S1	\$0.00	\$0.00	8/12/2014	\$3,262.31
2014S2	\$0.00	\$0.00	8/12/2014	\$3,254.77
2014S3	\$0.00	\$0.00	8/12/2014	\$3,013.67
2014S4	\$0.00	\$0.00	4/30/2015	\$3,231.17
2015S1	\$0.00	\$0.00	6/12/2015	\$3,677.34
2015S2	\$0.00	\$0.00	8/31/2015	\$3,641.55
2015S3	\$0.00	\$0.00	8/31/2015	\$3,432.72
2015S4	\$0.00	\$0.00	11/30/2015	\$3,432.72
2015TF	\$0.00	\$0.00	11/30/2015	\$106.00
2016S1	\$0.00	\$0.00	2/8/2016	\$4,356.91
2016S2	\$0.00	\$0.00	5/27/2016	\$4,356.91
2016S3	\$0.00	\$0.00	9/2/2016	\$4,356.91
2016S4	\$0.00	\$0.00	12/19/2016	\$4,618.33
2016S6	\$0.00	\$0.00	12/19/2016	\$114.48
2017S1	\$0.00	\$0.00	5/9/2017	\$4,035.91
2017S2	\$0.00	\$0.00	5/9/2017	\$3,736.95
2017S3	\$0.00	\$0.00	8/21/2017	\$3,736.95
2017S4	\$0.00	\$0.00	3/19/2018	\$3,967.89
2018S1	\$0.00	\$0.00	8/31/2018	\$4,771.88
2018S2	\$0.00	\$0.00	8/31/2018	\$4,848.06
2018S3	\$0.00	\$0.00	8/31/2018	\$5,027.61
2018S4	\$0.00	\$0.00	8/27/2019	\$5,720.31
2019S1	\$0.00	\$0.00	8/27/2019	\$5,837.55
2019S2	\$0.00	\$0.00	8/27/2019	\$5,679.78
2019S3	\$0.00	\$0.00	8/27/2019	\$5,259.06
2019S4	\$0.00	\$0.00	11/8/2019	\$5,259.06
2020S1	\$4,899.03	\$0.00	Not Available	\$0.00

Balance Due: \$4,899.03

These amounts are valid through the last day of the month. Statutory penalty will accrue on the first day of next month.

Commercial Structure Characteristics

Building #: 01

Occupancy: 310 # of Stories: 3 Year Built: 1987
 Struct Class: A Quality: B Condition: AV
 Floor Level: A Grnd Flr Area: 33120 Total Flr Area: 99360
 Wall Type: 07 Wall Height: 10 Perimeter: 2640
 AC %: 90 Heat %: 90 Rentable Units: 1
 mt: 0 Bsmt Util: 0
 0 Renov Rtng: 0 Eff. Yr Built: 1983